OCT 29 1928

VOLUME IX OCTOBER, 1928 NUMBER 10

Medical Lib.

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WITH

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Official Journal American College of Physical Therapy

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Published Monthly. Annual Subscription, United States and Canada, $5.00; Foreign, $6.50.

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ARCHIVES OF
PHYSICAL THERAPY, X-RAY
RADIUM

VOL. IX OCTOBER, 1928 No. 10

SELECTED SURGICAL PROCEDURES WITH SURGICAL DIATHERMY*

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BALTIMORE, MARYLAND

Since d'Arsonval, Reviere, Doyen, Cook and a number of other early workers used high frequency electric currents in surgery the profession has employed these agents chiefly in the treatment of malignant disease. In recent years a unique interest in electrothermic methods has arisen and a keen investigative attitude is present throughout the medical world. Surgeons are constantly studying the effect of heat producing electric currents on tissue with the result that new methods of attacking old and difficult problems are helping to solve them. I will describe some important advances made in this direction in the past few years in which I have had personal interest and participation.

HEMOSTASIS

To secure hemostasis in any surgical incision is always an important and frequently a difficult and long procedure. In ordinary abdominal wounds, amputations and external gynecological operations the problem is easily solved. It is in breast, neck and other operations in large areas of vascular tissue that the tedious tying of scores of vessels usurps a large amount of valuable time, frequently adding considerable danger. It is here that a technic rendering complete and prompt hemostasis with little trauma to tissue is welcomed as an important advance.

*Read at sixth annual meeting, American College of Physical Therapy, Chicago, Nov. 2, 1927.

When I began using high frequency currents in breast operations the technic was to clamp such vessels as were not sealed by the acusector (endotherm knife) then to secure hemostasis by plunging the active electrode into the tissues at the tip of the clamp, holding it in situ until a thin line of coagulation had appeared, stopping all bleeding. The clamp was then released. On one occasion the needle electrode touched the hemostat, short-circuiting the current through it. The inference was obvious, how much simpler to use the hemostat as the active electrode. With this technic I was able to bring about hemostasis during a radical breast operation in about one quarter or one fifth of the time usually taken to ligate the large number of vessels. The coagulated tissue is absorbed as easily as the ligature and strangulated tissue caught in it so that per primum healing is not prevented. (Med. Jr. and Rec., April 15, 1925.)

The technic is as follows: During the course of operation all vessels not sealed by the cutting current are caught with the usual hemostats. At the opportune time to secure permanent hemostasis these clamps are picked up one by one with the operator's left hand and touched with the active electrode carrying a coagulation current held in the right hand. The contact is maintained until a white line of coagu-

lation appears about the tip of the clamp when the needle and clamp are removed. The vessel walls are then completely coagulated together. The amount of coagulation needed in each case varies with the size of the vessel and occasionally while one is learning the technic a vessel has to be coagulated twice if sufficient time and current are not used at the first attempt. I have never seen post operative hemorrhage following this method of hemostasis.

Areas with General Ooze of Blood—Many times the surgeon is embarrassed by a general ooze deep in a pelvic or abdominal wound which cannot be checked by packs or pressure. The application of a short, thick spark, one of high amperage and relatively low voltage, serves to give complete hemostasis. When the bleeding is more profuse the needle electrode is applied directly to the surface until it has ceased.

HEMORRHOIDS

From this discussion of the hemostatic properties of high frequency currents one naturally thinks of the application of these currents to hemorrhoids. Indeed here we find one of the most strikingly useful fields. The advantages of this method over the usual type of hemorrhoidectomy are:

1. A practically bloodless and therefore rapid and simple operation.
2. The post operative course is smooth there being as a rule little pain, and practically no swelling.
3. In many cases it is an office procedure.

I have but once seen post operative hemorrhage from the treatment of hemorrhoids by high frequency currents. Usually there is very little slough, and rarely any inflammation around the site of operation. Healing takes place in from two to three weeks. Occasionally a patient will have some pain which subsides in a few days.

Anesthetic—Small hemorrhoids whether internal or external are readily removed under local anesthesia. One or two per cent novocain solution is injected subcutaneously around the anus and then deeply under the sphincters on all sides as high as the hemorrhoids extend. This allows thorough dilatation and adequate exposure. Large hemorrhoids should be removed under general anesthetic, ether being safe with ordinary precautions against explosions.

Technic—Several technics are prevalent. The oldest is that advocated by Clark and others. After thorough dilatation of the sphincter, allowing adequate exposure, the hemorrhoid is grasped with any suitable clamp. This causes stasis of the contained blood, making coagulation possible which is accomplished by inserting a needle electrode held in suitable handle and carrying a strong monopolar desiccating current into the vessel, allowing it to remain until the blood has coagulated and the intima has been destroyed. The clamp may then be removed without disturbing the contents of the vein. I refer to open and remove the clot, allowing free drainage for any possible infection. Theoretically the current sterilizes the tissues, but it is safer to leave good exit for any subsequent accumulations. Pain is more common after operations under local anesthesia and seems to be due to the injection, rather than the treatment.

Fig. 1—Diagrammatic representation of coagulation of blood vessels by author's technique. This is very valuable in amputating jaws and doing extensive gland resections and coagulations.

Fig. 2—Appearance of blood vessel after passing coagulation current through it. Shrinkage to about one-half length was noted. Ends of vessel are covered with fat.

I use a modification of this technic preferring the smoother, quicker active bipolar coagulating current. After coagulating the hemorrhoid beyond the clamp the active electrode is applied directly to the hemostat, the current flowing down it to the tissues held within its grasp. These tissues are then fused by the current. One must not allow deep penetration into the lateral structures giving a large post operative slough. The coagulated hemorrhoid is then removed with scapel or cutting current and the clamp released. Any point which tends to ooze a little may be controlled by direct application of the current carrying needle. This technic when properly carried out gives excellent results but has one danger namely that a bipolar current passing through the patient to and from the clamp to the inactive pad may cause wide destruction proximal to the clamp. With care however, this is avoided.

Recently Bierman (The British J. of Radiol., May, 1926) has devised an instrument unique in principle, each jaw being insulated from the other and connected to one pole of the generating apparatus. The current then passes through the base of the hemorrhoid only and not through the patient. This obviates the danger of deep penetration into the patient. When the hemorrhoid is removed with scapel or cutting current and the clamp released, a dry, white coagulated base remains. Theoretically this method is by far the best. I feel, however, that some improvements in the style of the clamp will aid materially in simplifying its use.

Fig. 3—Photomicrograph of cross-section of coagulated vessel. Note dark line of coagulated tissue around edge. Coagulated blood in center has contracted away from destroyed intima. Cells of all coats show heat effects, although coagulation has not taken place. Longer application would cause this, but is not necessary to cause hemostasis.

TREATMENT OF EPITHELIAL LINED CAVITIES

A few years ago I reported a case of ranula (Med. Rev. of Rev., Vol XXXII, November, 1925), in which the cyst was opened longitudinally with the acusector (endotherm knife) under local anesthesia and the epithelial lining destroyed with electro-desiccation. There was prompt healing in seven to ten days with a soft pliable almost invisible scar.

A short time after this while operating with Howard A. Kelly for a pelvic condition, a large post-operative ventral hernia was encountered. After completing the intra-pelvic procedures the mouth of the sac was incised and the abdominal opening closed with catgut. This left the large hernial sac lined with epithelium lying outside the peritoneal cavity. To obviate a long, bloody dissection of the sac my simpler technic was used as in the ranula. The epithelial lining was thoroughly destroyed by playing a strong desiccation spark over it. The fascia and muscle layers were then dis-

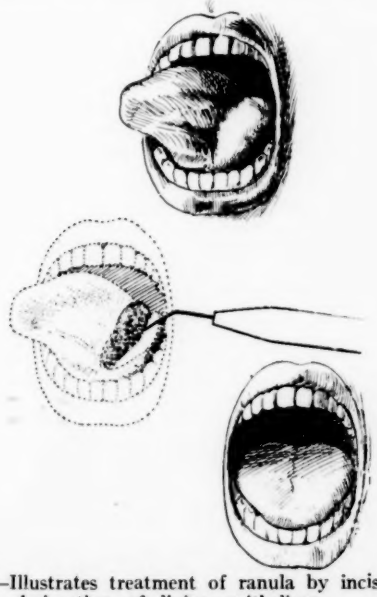

Fig. 4—Illustrates treatment of ranula by incision and desiccation of lining epithelium.

sected out, paying little attention to the now destroyed and dead sac. The wound was closed in layers and healed per primium, the desiccated cells being absorbed.

This useful method has since been employed in the treatment of small ovarian cysts, replacing the longer operation of resection, at the same time saving all of the ovarian tissue. These cysts are evacuated, the lining desiccated, and the cavity obliterated by suture. Often large cysts, especially malignant ones, are so adherent to the intestines that resection is dangerous, if not impossible. The epithelial lining of these cysts from which recurrences arise is quickly destroyed with the desiccating current, and areas of malignancy actually exploded out of existence.

INTESTINAL OPERATIONS

We have used electro-thermic methods in most of the various kinds of abdominal operations, cholecystectomies, gastro-enterostomies, hysterectomies, salpingo-oophorectomies and others. There is a definite advantage in the reduced bleeding in these operations. A specially useful place is in opening the viscera preparatory to making an anastomosis, resecting metastatic lymph glands in the abdomen and pelvis and nodules in the intestinal wall. Resection of such complicating tumors is tedious and dangerous. As suggested by Kelly, a strong current can actually explode the disease out of existence, the coagulated tissue being absorbed. To determine the safety of this procedure in the intestine I performed the following experiments on the stomach and colon of the dog. These organs were chosen because of their larger size than the smaller intestine.

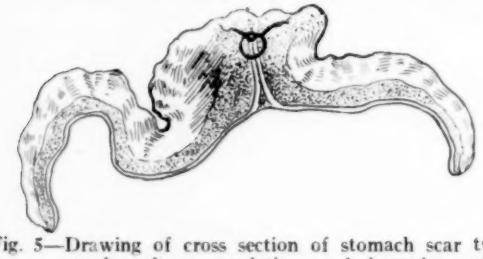

Fig. 5—Drawing of cross section of stomach scar two weeks after coagulation and inversion with black silk suture. Note suture in place and adventitia and mucosa grown over scarred area.

A small area the size of a large pea was destroyed with a bipolar coagulation current, the needle being inserted down to the mucosa. This caused destruction of all layers. The coagulated area was then inverted beneath black silk mattress sutures. Two weeks later section through this area showed healing of the tissues and absorption of the dead coagulated debris. There was no evidence of peritoneal irritation, the heat produced by the current sterilizing the intestinal wall as it coagulated. Although the needle was not allowed to perforate the mucosa, the entire thickness of the wall was coagulated, due to the projection of the current beyond the point of the needle as well as from all sides.

SUMMARY

Recent advances in the surgical uses of high frequency currents are:

(1) An accurate and rapid method of hemostasis without suture.

(2) Improved technic and instruments in the treatment of hemorrhoids.

(3) A new and rapid method of destroying the lining of epithelial cysts, saving long, difficult and dangerous operations.

(4) It is possible to destroy metastases in the intestinal wall and invert them with excellent healing.

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SIX YEARS EXPERIENCE WITH DIATHERMY IN PNEUMONIA*

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It is just six years ago that there occurred in the United States Marine Hospital, No. 21, New York City, a group of pneumonia cases with rather heavy mortality. The possibility that the use of diathermy might have a favorable effect symptomatically, at least, occurred to the writer at that time. He was not then aware that diathermy had ever been employed in this disease. Later it was learned that two other American workers had treated in this manner, several patients in whom they had made a diagnosis of pneumonia. The fact that six or eight years had passed without additional cases being so treated was probably due to skepticism on the part of the profession, either as to the diagnosis, or the results claimed for the treatment. It seemed advisable, therefore, to have as much as possible of the work done by the staff of a reputable hospital, rather than as a matter of personal practice. To this end the medical staff of the Marine Hospital co-operated most willingly. Diagnosis and physical findings, chest x-rays and laboratory typing were made by the regular medical staff, and the writer's department was concerned only with the administration of the treatments.

The first report of this work, "Diathermy in Pneumonia—A Report of Ten Cases," was published in the American Journal of Electrotherapeutics and Radiology, October, 1922. Other reports based on an increasing number of cases occurring in various epidemics in both hospital and private practice, were made from time to time, and led to a clinical trial of this treatment throughout the country. It is evident that great care must be exercised in accepting as of value any treatment for pneumonia. This disease in its mortality, varies so widely in different epidemics, in various sections of the country, and according to the predominating type of organism, that statistics on a few cases are practically valueless. Medical history is strewn with widely heralded treatments for this disease.

One of the most certain ways of obtaining data of value regarding mortality records is that of control cases. From 1922 up to the present we have records of a number of such control series, beside our own, in the hands of different men, notably Westervelt of Pittsburgh, and Walsh of Fairfield, Alabama. Other groups of treated cases where the average mortality with pneumonia had been extremely high for a number of years, showed so striking a lowering of the death rate as to tend to confirm the results shown by the control groups just mentioned. One of these was among the employees of a leading zinc mining company and the other among a group of defective children reported by Lacey, of Glenwood, Iowa.

In the discussion of a paper by the writer on this subject read last year before the Royal Society of Medicine in London, Miller spoke of the favorable results obtained in Schmidt's clinic in Prague. Since then, reports of the use of diathermy in pneumonia have come from South Africa, England and various cities in Europe. The results reported very closely parallel our own. So far as we have been able to collect the figures, the mortality in cases treated before the third day is almost nil, two deaths only, having occurred. The mortality rate in all of our cases to date is 12.1 per cent despite a vast majority of serious cases. It is not necessary here to go into the subject of symptomatic relief obtained almost routinely in the presence of pain, dyspnea and cyanosis.

TECHNIC

The technic advised in the preliminary papers and the first edition of the writer's text, "Diathermy and Its Application to Pneumonia," was based upon what could be done with limited apparatus and overworked hospital personnel. Two treatments a day, with electrodes sufficiently

*Read at sixth annual meeting, American College of Physical Therapy, Chicago, Nov. 3, 1927.

large to cover the involved area, anteriorly and posteriorly, at 1400 to 1800 ma. for twenty minutes were advised. It was soon apparent that the symptomatic relief afforded the patient lasted in its full effect not more than four hours. Later we felt that more rapid progress could be obtained in the average case by treating every four hours, omitting, perhaps, that in the early morning.

Caution was advised in the use of diathermy in empyema, a complication which has occurred about one-third less than is usual in untreated cases. We now not only continue, but intensify the treatment in the presence of empyema which can be successfully treated, once the patient has passed the critical stage of his pneumonia. Low blood pressure in several instances led to stopping the treatment when we now believe the patient might have survived, as have others since, with equally low pressure.

In an attempt to treat only the involved area, undoubtedly extension often failed of detection and was well established before it, in turn, received treatment. We now use larger electrodes, overlapping the uninvolved area of the lung as far as possible and believe the instance of extension to be distinctly less than formerly. With the improvement in our results which followed the increase in the number of treatments, from one or two, to five in twenty-four hours, consideration was given to the possibility of still further intensification in desperate cases, and to how often it was possible safely to repeat the treatment. A case in point soon occurred in private practice.

Case 1. The patient, a trolley employe of Swedish birth, 54 years old, weight 245 pounds, seen on the fourth day of his illness, had a recent extension of his lobar pneumonia from two to four lobes. After his third treatment the technician reported by telephone that his condition was desperate; the family physician, consultant and nurse shared this feeling in regard to him. They were told that an intensification of the treatment was the only possible aid, but that it had not been tried, as far as known, up to then. They readily agreed to the suggestion. This patient was then given 2500 ma. through electrodes covering nearly the whole chest, for one hour, at hourly intervals through the entire night. His condition steadily improved and he made an uneventful recovery. This and other similar, though less striking cases, have convinced us that we should intensify the treatment whenever conditions are extremely unfavorable.

How long may diathermy be applied with safety? The next case will illustrate the possibilities that lie before us along this line.

Case 2. A boy of 15 was very ill from a three-lobe involvement on the third day of his disease. He had received the last rites of the church just before we were called. His pneumonia was complicated with peculiar arythmia of the heart which would beat at about 97 for two or three minutes and then jump to 150 for the same length of time. He was very cyanotic and had every appearance of impending death. He responded very satisfactorily to treatment for about seventy-two hours when there was another hurry call for consultation. This time his condition was even more grave and it was a question whether he would live until the treatment could be applied. It had been about four hours since he had been given the last diathermy treatment. The two physicians on the case and his parents were told that it might be worth while to try a continuous diathermy which was frankly experimental. The treatment was applied and kept on continuously at about 1400 ma. for six and one-half hours. The patient's clothing and bedding were in such a condition that it was deemed advisable to change him into clean woolen blankets. Although this was accomplished rapidly and skillfully, he died in less than a minute from the time the current was turned off. That this patient could have survived is beyond our comprehension. The interesting phase of the case was his survival for about the same number of hours that we would have allowed him in minutes, on the strength of his appearance.

What may occasionally be accomplished under heavy odds is illustrated by case 3. This patient, a man of 33, in a nearby town, was seen on the fourth day of a lobar pneumonia involving the entire right lung. Intensified treatment had just been started when signs of involvement of the left lung began to appear. Within twenty-

two hours the left lung became entirely involved while the right had cleared with unusual rapidity. The patient was able to obtain sufficient air through that lung to survive. Although his condition remained precarious for several days and prolonged treatment was necessary, he recovered. Our satisfaction in seeing a five-lobe case survive was intensified by the laboratory report of a type 3 pneumonia.

SUMMARY

Reports received from all parts of the country and from abroad show a steady increase in the use of diathermy in pneumonia. With added experience, our results are certainly improving. The symptomatic value of treatment has been, for some time definitely established. After six years experience with diathermy in this disease, the writer, here for the first time, makes a definite claim, which he feels is now fully substantiated, for a lessened mortality in treated cases. It was only a few months ago that the commanding officer of one of our leading hospitals stated, "Not a single case of pneumonia has been lost in this institution during a period of over a year. Every case receives diathermy immediately upon diagnosis."

Perhaps the most encouraging factor in this work has been the reaction on the part of the family physician and consultant to the treatment of their patients, based on their experience in pneumonia cases. It seems now to be established for certain that an agent of great value in the treatment regime of pneumonia has been found. The word "cure" has not been used or implied. The disease has not been shortened in our hands, but it has been made more tolerable and we feel, less fatal. The problem of the future in this work revolves around dosage, frequency and duration of application of the treatments. It is most likely that we have erred on the side of caution in the presence of hypotension, empyema and severe phases of the disease. Is not caution always advisable in the application of a new and powerful agent to so fatal a disease as pneumonia, a disease in which innumerable treatments have been tried and discarded in an effort to lower its mortality? If in the light of our recent experiences, here placed before you, a trial is made of more intensified treatment, the object of this paper will have been accomplished.

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THE PERILS OF OBESITY*

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Over-indulgence in eating has been one of man's vices since the beginning of time. If we remember correctly, this taking of forbidden fruit caused some trouble and discomfiture to one of our ancestors in the Garden of Eden, in the reputed beginning of man's career. Whatever the beginning may have been, it is apparent that man's tendency to overeat has not grown less with the ages that have passed. All through history and literature we find records of the corpulent and the glutton, with their attendant physical and mental handicaps from over-indulgence in food and drink. Shakespeare created his classical Falstaff with obese proportions. Those of us who have read Washington Irving's "Legend of Sleepy Hollow" will recall Ichabod Crane, not indeed himself an overfat gentleman, but one with an unduly keen and anticipatory appetite for the joys of the table. Let us recall some of Irving's interesting description:

"The pedagogue's mouth watered as he looked upon this sumptuous promise of luxurious winter fare. In his devouring mind's eye, he pictured to himself every roasting pig running about with a pudding in its belly, and an apple in its mouth; the pigeons were snugly put to bed in a comfortable pie, and tucked in with a coverlet of crust; the geese were swimming in their own gravy; and the ducks pairing cozily in dishes like snug married couples, with a decent competency of onion sauce. In the porkers he saw

*Read at sixth annual meeting, American College of Physical Therapy, Chicago, Nov. 2, 1927.

carved out the future sleek side of bacon and juicy relishing ham; not a turkey but he beheld daintily trussed up, with a gizzard under its wing, and peradventure a necklace of savory sausages; and even bright chanticleer himself lay sprawling on his back in a side dish, with uplifted claws, as if craving that quarter which his chivalrous spirit disdained to ask while living."

That obesity is an undesirable condition is made evident by some of our common expressions of every day usage. We say, facetiously, that "nobody loves a fat man;" we refer contemptuously to those who are "fat-headed;" and Shakespeare tells us that "Fat paunches have lean pates; and dainty bits make rich the ribs, but bankrupt quite the wits."

Obesity is clearly due to one of three general causes, viz.: over-nutrition, under-oxidation, and endocrine disfunction. The first two are easier to control than the latter. Tait McKenzie facetiously speaks of obesity as of three kinds: enviable, comical, and pitiable. Dr. Leonard Williams of London, in his recent book on Obesity challenges this classification, and says that "No case of obesity is enviable, most of them are in a sense comical, and all are pitiable."

I propose in this paper to quote from Dr. Williams very freely, because of his clever and unique contribution to the subject, and because of the somewhat unusual and rather radical statements, especially as regards the treatment of obesity. I would recommend to you a careful perusal of this book. At its beginning we are told that there are only "two kinds of obesity; the one is alimentary in origin, and is caused by surfeit; the other is endocrine in origin, and is caused by an underaction of an endocrine gland. There are, therefore, several kinds of endocrine obesity, and there are only two adjectives that can suitably be used to describe it,—namely, contemptible and disgusting." Every degree of alimentary obesity denotes self indulgence, greed and gormandizing as well as an unsightly distortion of the human form divine, and often a serious impairment of the intellectual faculties. Dr. Williams contends that woman is inclined to regulate her life more carefully than man, and that for reasons of personal appearance, she is more solicitous of her unnecessary gain in weight. To quote again:

"It would be an interesting inquiry which would ascertain for us the real explanation of the fact that woman, while thus regulating her own life upon a very high plane of simplicity and restraint, nevertheless insists in over-feeding her mate. This she does, not spasmodically, or intermittently, but regularly, as though it were part of a settled policy. It may be, perhaps, that she takes the same simple pride in his *embonpoint* that a farmer takes in his well-fed animals, but the real cause probably lies deeper. She urges him to eat more than he needs for reasons mental rather than physical. She realizes by a sort of hereditary sex instinct that a fat man is easy-going, yielding, uncritical, stupid, in fact. She knows that Caesar was right for distrusting Cassius on account of his 'lean and hungry look.' Such men are always alert, and are therefore liable to be dangerous. All tyrants know that they are safe with fat men, and the domestic tyrant is no exception."

There seems to have been from time immemorial the idea that man had to eat as much as he could, to "keep up his strength." No doubt in the savage days of primitive man, periods of feasting came seldom; but when they were made possible from occasional successful expeditions in hunting and the like, then the natural tendency was to stock the larder of the stomach to its utmost capacity. But these periods of feasting were usually followed by periods of fasting; so perhaps the unusual indulgences were not attended by very disastrous results. In our present civilization the securing of food is not difficult; so far as being an "exciting adventure, as with our remote ancestors, the obtaining of the next meal is a dull and prosaic certainty, and its consumption, instead of being an eager satisfaction of actual needs, is becoming a melancholy fulfillment of a solemn duty, which unless it is introduced by cocktails and punctuated by pickles, is positively and painfully distasteful."

It is safe to say that nine out of ten of us eat too much. With an ordinary sedentary life and little expenditure of muscular effort, most of us need but little and simple foods to keep

up efficiently the body metabolism. May I refer to this group of men, for example? The majority of us are underexercised and overfed. We attend meetings of this sort, and for days remain in a state of quiescence—physically, at least. We celebrate the occasion by frequent banquets (at many dollars a plate), we consume a variety of soups, fish, meats, salads, relishes, desserts, and then end up with roquefort, or some other sort of outlandish cheese. All of this would require an active life of rail splitting, prize fighting or cross country running to properly dispose of. Is it any wonder that we grow sluggish mentally and physically, and that we take on increased measurements around the waist line? Fat is the cheapest substance of the human body. An excess of it serves no good purpose, but on the contrary is a handicap in every respect, and often a dangerous handicap. In order to digest, assimilate and store this fat, an enormous amount of energy is expended—energy which we might employ advantageously in other and better directions. Fat is disfiguring and crippling, and it really acts as a parasite in the human body, and like other parasites, its gradual deposit is insidious. The moral, then, is to watch for its first appearance, and to take steps against its further increase. It is often necessary to take many steps, and sometimes fast ones! We must remember that it is vastly easier to prevent the formation of excessive fat than to rid ourselves of it, once it has infiltrated the tissues of almost every organ of the human body. The concentration of the fat on the internal viscera is especially disastrous. Frequent use of the scales will give warning of impending disaster, but there are other signs which one may easily observe. Some of these are undue breathlessness after exertion, indisposition to exercise, a sluggishness of brain and muscle. Dr. Williams says that a "fat man has not grown fat in a single night, but has achieved his rotundity by a steady activity of his masseter muscles, sustained with grim determination and over a long period of time."

Often we hear our friends gleefully boasting of the fact that they are getting fat. They treat it lightly, as if it were quite a joke, and so they "laugh and grow fatter." But it is a serious thing. They tell us that around 30 or 40 years of age, it is natural to pick up weight; so the lady who is "fair, fat and forty" has come to be an accepted fact in our civilization. Consult any weight table on the drug store scales or even in insurance statistics. They all indicate what the weight should be for certain heights and certain ages. There is a gradual increase in weight, specified as normal, as age advances. But is this true? Why in heaven's name should we get fat at 40? Is there any physiological necessity for such an occurrence? Are there any reasons why the average weight of any young man, say at 25, should not be maintained throughout the years of middle life, and if anything, a gradual decrease occurring during this period, and in old age? My contention is that a state of gradually increasing weight is most often due to incorrect habits of eating and exercise; in other words, not "keeping fit." And this must be consciously and continuously done. Easy circumstances, an easy life, the acquisition of wealth, the increase of leisure, all have their untoward effect in throwing us out of balance, with disastrous results.

It is apparent that obesity is a concomitant, if not a direct cause of many bodily ailments. It is said that an overfat man is in position to take on readily almost any disease under the sun. The abdominal contents are usually first affected by the infiltration of fat; hence gastro-intestinal disturbances. The liver and great omentum are particular sufferers. "A fat encumbered liver cannot fail to communicate its distress to the insulin-bearing pancreas, and the secretin-bearing duodenum, and thus to the whole digestive machinery." Constipation is liable to arise; ptosis of the abdominal organs leads to a wide variety of disorders. Neuroses occur frequently; the association between glycosuria and obesity is very close. Arthritis and neuritis are frequent in the obese. "The fatty obstruction to the return of venous blood almost invariably gives rise to a varicose condition of the veins below the pelvis. Hence hemorrhoids are common. Hernia is a frequent result. The obese individual is a good target for microbic assaults and for cardiac diseases of many varieties. We all recognize the bearing of obesity on asthma and upper respiratory disorders. And so the list might be multiplied. Truly, there are perils in obesity!

Dr. Williams points out that man is essentially a katabolic animal, and woman is anabolic. Katabolism is the destructive side of metabolism. Man expends a greater amount of energy; woman's function is more of assimilation and storing. "Woman is a cumulator, man is a live wire." "Man should always be in training for vigorous exercise, in order to defend himself and his belongings; woman should always be physiologically prepared for a possible pregnancy. Man is a destructive katabolist; woman a thrifty anabolist." And hence obesity, if slight, is more excusable in woman than in man. It has been said that no man has a right to be overfat, and no woman a right to be overthin. When man, by his soft and easy living ceases to be a katabolic creature and takes over the characteristics of the anabolic, there is an evident tendency toward feminity. Perhaps the reverse is also true; this may have a bearing on the ultra athleticism of women, in that it tends to compromise the prospects of maternity.

There is time only for a very brief mention of the relationship between endocrine dysfunction and obesity. The actual process of disturbance is not well understood at present; and yet we recognize clinically the intimate connection between the endocrines and obesity. The glands which manufacture the precious chemicals that make a balanced metabolism we know as the endocrines. Thus we may suppose that chemical disturbances are always present, which lead to abnormalities of many sorts. The endocrine system is closely related to the sympathetic nervous system. The gonads have their influence upon obesity. Castration in the male brings about the condition. Engelbach estimates that 60 per cent of juvenile obesities are due to hypo-pituitarism. The thyroid has a marked influence on growth and development, as we know. Cases of endocrine dysfunction, with attendant obesity, are in a class by themselves, and must be treated medically before the obesity can be eliminated. Excessive exercise in these cases does not seem to have a beneficial effect; often quite the contrary.

And now we come to the physical therapy treatment of obesity. In the alimentary variety (the most common form), it is altogether rational to increase the output of neuro-muscular energy, and to restrict the intake of food and drink. "Eat less and exercise more" is the common advice which we give. In most cases, it works; but not in all. Dr. Williams' unusual suggestion in the treatment merits consideration. He states that sometimes "muscular exercise increases anabolism, and the only way to arrive at good results is to lessen the intake both in quantity and quality, and to refrain from interfering with the output." Hence his plan of putting the obese patient to bed until by dietetic means, the habit of storage has been overcome. In this treatment, heat is emphasized. The patient must be kept unusually warm. This is done by blankets and by means of radiant heat and light, cabinet baths, infra red, and general and local diathermy. Ultra violet is a regulator of the endocrine functions, apparently. Hence a course of ultra violet should be part of the treatment. "Some cases of obesity show a continuous sub-normal temperature." Raising the temperature of the body is not included in most forms of treatment, but this result is often obtained, perhaps not intentionally, in the administration of thyroid extract." Sometimes this succeeds in obesity, sometimes not. "Thyroid extract fans the metabolic flame."

Hydrotherapy is a valuable adjunct to the treatment of obesity. Hot packs are useful, as are other forms of hydriatic treatment; but the endocrine varieties seem to yield better to the forms of thermotherapy than do the purely alimentary varieties of obesity. In the latter cases, abdominal exercises play an important role, when combined with more general muscular movements of the body. The exercises ought to be sufficiently long continued, in robust cases, to produce at least a moderate degree of perspiration. The abdominal exercises should not only bring into play the recti muscles, but should include the equally important external and internal oblique, the quadratus lumborum, the transversalis, and the erector spinae muscles.

Exercises of all sorts should be prescribed and supervised with care, and the cardiac condition and reaction to exercise especially noted. We must remember that our obese patient is already carrying a load of 20 to 40 or more

pounds over and above a normal body weight, and we must not suddenly impose a great burden on the cardiac, respiratory and excretory organs, but build up a system of graded movements to suit the individual case. Excessive fatigue and the accumulation of toxins from unaccustomed work must be guarded against. In every case "it is wise at first to concentrate upon the reduction of the intake to the point where the patient is forced to live upon his reserves." Various systems and methods of fasting are in vogue in certain quarters; also the restriction of diet to include only uncooked foods which contain considerable bulk, but little sustenance. Purgatives are sometimes indicated, especially at the beginning of treatment, but should not be long continued. Some advocate a three-day fast, preferably in bed, for every case of obesity. The method has merits. The breaking of the fast is generally done by the moderate consumption of fruits and fruit juices. In most of the systems of diet, the carbo-hydrates and fats are excluded. In regard to sugars, "refined cane sugars and beet sugar are the irritating enemies; while fruit sugar, grape sugar and honey are the bland, accommodating friends." Uncooked foods seem to be entirely advantageous in most cases, especially in the endocrine variety of obesity. As to glandular therapy, Dr. Williams advises the administration of thyroid and pituitary in combination.

CONCLUSIONS

Obesity is undesirable, from an esthetic and physiological point of view. It favors disorders of the cardiac system, as well as those of the renal, hepatic and digestive and respiratory systems. Its treatment is fraught with difficulty, especially in the endocrine variety. Overeating is a common fault. Uncooked or "unfired" foods are valuable in the diet of obesity. Exercise, rest, as well as fasting, are essential. Too much sleep favors obesity. Loss of weight rapidly follows loss of sleep and depressing mental emotions. "Of all parts of the feast, that which one leaves does the most good." To avoid obesity, sleep little, work more, and eat less. Keep your eyes open, your bowels open, and your mouth shut!

TREATMENT OF BONE AND JOINT INJURIES*

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Injuries to bones and joints are due to direct and indirect violence and from sudden muscular contraction. With the introduction of high-powered machinery and the automobile, more injuries to bones and joints occur. These vary in degree from a mere contusion to the more elaborate ones which are accompanied by all the complications and sequellæ these structures are heir to, and no matter how slight the injury may seem, it can result in an impairment of joint or limb. Microscopic tears in ligaments or periosteum can become so grave as to cause much concern to both the patient and the surgeon.

Much of the responsibility as to the final result of a bone or joint injury depends on the doctor or surgeon who first attends the case. Many cases are made worse by improper first aid treatment, such as too tight bandaging, faulty splints, improper position and failure to recognize the gravity of the injury. With this in mind, let us discuss some of the methods which tend to lessen the unpleasant after-effects which follow such injuries.

In order to refresh our minds concerning the repair of bones following injury, it might be well to briefly review the cycle of restoration. Immediately after fracture of a bone, there is hemorrhage, followed by clotting, around the break and beneath the periosteum. The clot is replaced by leucocytes and fibroblasts with a hyperplasia of tissue and granulation tissue. Vascularization then takes place and lime salts are deposited between the vessels. Callus is thus formed, first temporary, next permanent. Then both by a destructive and constructive process, true bone is formed. Ligaments undergo much the same cycle as bones, except that

*Read at sixth annual meeting, American College of Physical Therapy, Chicago, Nov. 3, 1927.

no lime salts are present, the blood clot being replaced by fibrous tissue. This process takes from several weeks to a year in the case of bone, while in ligaments the time is shorter.

It is well to keep in mind this cycle of repair, especially if physical therapy is to be employed, because it may undo what nature is trying to do. The time *when* to begin is an individual problem, but because of enthusiasm for speedy recovery, oftentimes these measures are begun too soon and without any consideration of the physics of the agents used. The repair of bone and joint injuries is a perfectly well balanced physiological phenomenon, and the element of time plays an important role. If physical therapy is instituted before the propitious time, the normal physiological cycle becomes a pathological one. For instance, if diathermy is begun during the hemorrhagic stage following a fracture, there is a great tendency to the formation of fibrous tissue rather than callus, and non-union is inevitable, while if sufficient time is permitted for proper organization physical therapy will hasten repair and bring about a more satisfactory end result.

With this in mind, the first thought after injury is *rest*. This is afforded by putting the patient to bed, if necessary, or placing the injured part in a proper splint. If there is much pain, swelling or effusion present, convective heat in the form of radiant light or infra red is indicated to relieve pain and promote absorption. Also a comfortable splint is applied. This should be well padded. Personally I use very thick pads of soft cotton batting between the splint and injured part. Besides affording comfort, the part is kept warm, and if applied following the heat treatment, the tissues will react better and repair is hastened. Again, the simplest splint which is comfortable to the patient is the best. Elaborate, bunglesome splints are no better than simpler ones, provided proper position is maintained. It is my practice to make the splint fit the injury, rather than make the injury fit the splint. With a little ingenuity on the part of the surgeon, this can be accomplished without any great difficulty. Molded plaster and wooden ones are always available. Much can be done with a piece of ordinary board, a good pocket knife and a few plaster bandages.

When a bone or joint injury presents itself an x ray should be made immediately to ascertain the extent of the trauma. Without this, a fracture may be overlooked, or a case treated for a fracture which is not present. If fracture is present, an effort at reduction is made immediately; but if reduction is not complete, wait four or five days before attempting again, except in a few special cases. In the reduction of fractures do not fail to employ a general anesthetic, if necessary. Relaxation is of primary importance. In all cases of reduction, remember that a fracture properly reduced will nearly always maintain its correct position, then splinting becomes an easy matter. This applies to all simple fractures, but in compound ones more care must be taken to prevent infection, which is the most serious menace to healing and repair.

Fractures of long bones do not give as much concern as do joint fractures, for individuals can accommodate with an inch or so of shortening, while a partly ankylosed, or ankylosed joint is a considerable handicap. In the treatment of joint fractures too much attention is paid to position, while mobility is of prime importance. X rays may show much anatomical disturbance, with perhaps many small fragments around the joint, but nature will take care of these if motion is maintained. It is my opinion and observation that joint injuries have been immobilized too long a time with the expectation of breaking up any ankylosis at a future period, but as it is the function of a joint to move, movement should be begun early. It is my practice to begin motion as early as six days, and never later than twelve days. It may sound radical, but practical experience has proved this point.

In view of the fact that motion should be begun early, it may be well to consider the treatment of a few of the more common joint fractures. The commonest, perhaps, is Colle's fracture, and, since automobile trucks are not equipped with self-starters, truck drivers furnish a large majority of these fractures. A Colles fracture, if seen early after the accident, can be

reduced without an anesthetic, but if of longer standing anesthesia is necessary. This is one fracture which, if properly reduced, will maintain its position. I am still of the opinion that a straight anterior and posterior splint is best, but there is a great knack in applying soft cotton or lamb's wool pads around the injured bone ends. Place these pads where they will mechanically elevate, or depress the bone ends in such a manner as to do effective work. The x ray and tactile sense will direct where the pads should be placed. If a Colles fracture is set properly, the pain is reduced to a minimum immediately, and should much pain persist after reduction, it is significant that reduction is incomplete. This is a very simple point, yet of great diagnostic value.

When proper reduction has been made, I allow the arm to be held in splints for seven days, then take it out of splints and examine it. If it appears all right, give it a slight massage, using alcohol and glycerin as an emolient. Then replace in splints for another seven days, when it is again removed from the splint and diathermy begun. Following the diathermy seance, slight manipulation and massage is practiced.

The splint may be discarded at this time, or a shorter, single anterior splint applied. This treatment is repeated daily and as soon as improvement in motion is shown, then leave off the splint entirely, and allow patient to carry arm in a sling. At the end of ten days or two weeks after diathermy is begun the patient is usually discharged as cured and allowed to resume his usual occupation, with the caution not to be too active with the erstwhile injured member.

Fracture in and about the elbow joint is another which gives much concern. As a working basis in such cases, I am guided by several general rules, which are:

(1) If the fracture is at the lower end of the humerus, place the arm in hyperflexion.

(2) If through the joint, place the arm at a right angle.

(3) If through the Olecrenon, place the arm at an angle of 60 degrees, and

(4) In those fractures below the joint, treat as fractures of the forearm.

Most all injuries around this joint show a vast deal of swelling and effusion. This must be taken into consideration when treating such a case. Should the patient be a large individual, with thick muscular arms, any reduction may be delayed for five or six days, keeping the patient in bed and the arm supported on soft pillows. Radiant light or infra red can be effectively used here to great advantage.

In children or adults with small arms this is hardly necessary, and reduction can be done immediately. It is my custom to keep the arm in splints for ten days. Molded plaster splints are preferable. At the end of the ten-day period motion is begun, along with massage, and then replaced in the same splint and allowed to remain five days longer, when diathermy and manipulation are begun and given daily. The splint is left off entirely from now on, the only support being a properly adjusted sling. Allow and encourage the patient to move joint at will, using common sense and reason at all times. The results, with this method, are far superior to any previous ones, and in a series of cases thus treated, more satisfactory end results are accomplished.

Fractures of the shoulder joint are difficult, no matter where they occur. The muscle-pull is in four different directions, and no one method will suffice. Shoulder fractures either require elaborate splints, or none at all. Here is one exception to the simple splint. So-called aeroplane splints do have an advantage here. But again, do not immobilize too long. Ten days is the average time to begin motion, realizing that strong muscles pull against the weak, and atrophy is prone to follow, but, after spending some time in the dissecting room, I have come to the conclusion that the coraco-humeral ligament is the part which gives the most concern. This is the most important structure of the shoulder joint, even more so than the sturdy capsular ligament. With these facts in mind, I always place the part in a position which tends to lessen strain on the coraco-humeral ligament. This ligament is nearly always injured to a more or less degree, and I am guided

by the x ray examination as to the position of the fragments in these cases. After the ten-day immobilization period, I usually remove the splint and begin diathermy, manipulation and massage, along with a surging sinusoidal current. This latter furnishes cellular massage, which cannot be obtained with any other method. A proper sling is employed to give the necessary support. Here nerve injuries show themselves and the surgeon must recognize them early, lest degeneration take place, and add more disagreeable symptoms. Diathermy is difficult to direct through a shoulder and this is where I use the two-machine method, as described in previous publications. The treatment of shoulder injuries is continued from six to ten weeks, and the patient advised to use care and caution lest more harm befall him. Playing pool or billiards is an excellent therapeutic exercise for the upper extremity.

Injuries about the ankle joint also require special treatment. Often diathermy is begun immediately, and this, in my opinion, is unwise for the reason that an extra hyperemia is added to an already active congestion. It is my practice to apply convective heat, then a snug bandage over thick cotton batting for the first two or three days; then follow with diathermy daily until all symptoms have subsided. After each treatment, the ankle is strapped, or bandaged, so as to take the strain off the various ligaments. In those cases where diathermy is given immediately after the injury, the pain may be somewhat relieved, but there is a persistent swelling which prevents the patient from wearing a shoe for a longer period of time than otherwise.

Again, Potts fracture frequently complicates a sprained ankle and may not be recognized until too late to prevent the unpleasant characteristic—deformity. Of course, there are strained or contused ankles, but an ankle with torn ligaments, swelling, ecchymosis and a large degree of pain is the real sprained ankle.

Should a fracture through the ankle joint be present, keep the patient in bed until the swelling subsides, then apply a plaster cast and allow to remain ten or twelve days, when it is removed and diathermy, manipulation and massage begun, and given daily until the parts are well. The average time is six to eight weeks.

Fractures of the other joints are treated in the same manner, bearing in mind that mobility is the first consideration. If this cardinal point is stressed, many joints will retain their mobility which otherwise would remain immobile.

After considering the treatment of a few common bone and joint injuries, it may be well to discuss some of the complications which accompany these conditions.

For those that show too much effusion—which occurs when there is a great amount of trauma to the soft parts—apply convective heat, and massage, using mild, stroking movements, but no manipulation. Tapping is a poor surgery and is hardly ever necessary. The swelling usually recedes within a week, when regular treatment can be instituted.

Infection is probably the most difficult situation to overcome, and, as previously stated, the first aid treatment is extremely important. In wounds where there is much devitalized tissue present, use all the precautions of ordinary sepsis, along with exposure to the ultra violet light. The ultra violet light, along with ten per cent mercurochrome, will do much to check virulent infections. It is best to clear up all infections before attempting any extensive operative procedure, even such manipulation as co-apting the bone ends, lest nature's barrier be disturbed and the infection spread.

Osteomyelitis is another complication which must be met. In my opinion, this condition does not follow infection so much as it does faulty local nutrition. Fractures interfering with the nutrient artery, or other vessels, are more likely to result in osteomyelitis. Free drainage, along with vigorous, persistent diathermy, will usually clear up this condition. Besides the bone structures, the sinuses must be treated so as to become free of infection. The sinuses themselves may be the source of infection, and they should be kept as clean as possible.

Osteoarthritis is also a troublesome complication. This condition often arises from an endogenous infection which must be looked for

and removed. Bad teeth, infected tonsils, or an old prostatitis, along with an intestinal toxemia, may be responsible for this. The treatment I employ is diathermy, plus intravenous doses of sodium iodide and guiacol. Also tonics of iron, arsenic, phosphorus, manganese and calcium, given orally.

Again, there are fractures which simply refuse to unite. The cause is indeterminable—just why they will not, no one knows. Excluding tuberculosis, lues, malignancy, malaria and other systemic conditions, a theory has been advanced that it is due to lack of a specific enzyme which it is necessary for repair. For these cases, I use diathermy through the fracture, body radiations of ultra violet and the administration of mixed gland products. I have in mind two cases which were treated in this manner and both made complete recoveries, after refusal to heal for several months prior to this treatment.

In closing, I wish to stress several points which I deem of cardinal importance in the treatment of bone and joint injuries. First, complete rest and relaxation during the first few days after injury. Next, early mobility for joint cases. Again, judicious use of physical therapy, bearing in mind the time *when* to begin such measures, and not to employ them too soon, in our eagerness to obtain quick results. Attention to the general health of the patient, especially advising the proper diet and the liberal administration of tonics, to overcome any secondary anemia which is likely to occur.

With these points in mind, even better results can be accomplished for bone and joint injuries, remembering that physical therapy plays an important role in their treatment.

Discussion

Dr. F. H. Ewerhardt (St. Louis, Mo.): Dr. Walke's point that was of particular interest to me was the question of motion in fractures. It is an excellent scheme to have the patient do what he likes. I use an Indian club for the very same purpose. In the case of Colles' if we will just bend the finger passively the first day, no harm will be done. Our rule is that motion in fractures can be applied if you bear in mind that you apply this motion so long as you feel sure you are not disturbing the alinement of the bones. If you feel quite confident of your bones, there is no reason why you shouldn't do it, and these exercises do help to return circulation.

Dr. Walke spoke of non-union. I am reminded of a case we had in the hospital last winter, a case of a femur. It was not under my control; it was sent in the hospital by another doctor. It was of three months' standing with non-union. Everything was tried by this man; he lost the case and the patient went elsewhere. The second man applied nothing else in the world but ultra violet radiation and the man was cured in due time. Remember, in these non-union cases, ultra violet radiation is very useful.

Another point I wish to make is that we should remember that in fractures of the arm anywhere, the elbow or the forearm, the same force which causes that condition oftentimes causes an injury in the shoulder condition, and where you have a hemorrhage, an extravasation of blood, you also have adhesions. You oftentimes find after the fracture is cured, the patient suddenly discovers that he cannot raise his arm because the injury in the shoulder was not treated.

Dr. Frank H. Walke (closing): This is one of the things we can talk on forever and ever because each one shows a different problem. Early motion in joint fractures is the proper thing. Bear that in mind, because even though we have a poor anatomical picture with respect to fragments and the like, if we maintain motion in the joints the anatomy will take care of itself. I have treated cases in this way and have had far better results than otherwise.

You know there is nothing like sending a fellow hunting or fishing and making him go up rough bank for ankle conditions. The bird or the jack rabbit comes along and he jumps up to go after it. He forgets his ankle and is all right. A man with an injured or sprained ankle favors it a long, long time, even though he knows it is well. I always figure out some particular place for that man to go, where he will use more than ordinary exertion.

SOME RECOGNIZED USES OF ULTRA VIOLET IRRADIATION IN SKIN DISEASES*

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Ultra violet rays as a therapeutic agent have in recent years achieved a most remarkable vogue. The literature on the subject is astounding, both in its volume and in the enthusiasm of its authors. What worth-while thing can possibly be added?

The agent is in the hands of school nurses, hospitals, private homes, chiropractors, masseurs, beauty parlors, barber shops, and of semi-ethical and ethical physicians. It is prescribed like a bread pill, with the utmost urbanity and confidence, at least in its innocuousness. The agent is used in an imposing list of conditions, ranging from flat foot to shining scalps. May I quote the assertions of a few?

Speaking of flat feet: "Briefly, our technic in this type of case consists of securing a first degree reaction on the soles of the feet. . . . a first degree reaction over the lumbar and sacral spinal regions, stimulating the nerve supply to the legs and feet, aiding in the relief of pain."

To quote another: "Within the past two years I have treated twenty-three (23) cases of pruritis ani et vulvae with ultra violet light. The results have been all that one could wish." This may be true, but pardon me if I seem dubious.

Once more: "Alopecia Hereditaria, of long standing, with atrophic shiny scalps has yielded with entirely satisfactory regrowth of hair, in most cases, after a few months of ultra violet irradiation." This last weighs extremely heavily upon my credulity.

One would "sound a warning," but what is the use? Warnings are being broadcast by reputable manufacturing houses, and by the leading medical publications from the Journal of the American Medical Association[1] on down the line. We now have a special, and a very able committee on physical therapy, under the sponsorship of the American Medical Association. More care is being given to investigations before reports are published. Real progress is in prospect in such efforts for a standardization of nomenclature as that suggested by Goodman;[2] such work as that of Fries,[3] who, with Topper, has demonstrated the small variation of the basal metabolic rate in children after repeated exposures to ultra violet light; the work of Rekling[4] on the mode of action of light in rickets; that of Leighclare[5] on the effect of excessive exposures; and finally in the various experimenters on food irradiation such as that by Steenbock and others.

Clinical and laboratory experience unite in affirming that ultra violet rays induce general metabolic changes. In some instances, as in diabetes, this may be distinctly harmful; but in tuberculosis, in rachitic conditions, in juvenile (and in some instances, adult) cachexia due to inanition, in some types of anaemia, and in a few other conditions beneficial results are too obvious to be denied.

As applied to dermatoses, one is justified in suspecting, in some cases, a general effect from local exposures, and vice versa. In certain conditions, such as urticaria, generalized pruritis, and diffuse exfoliating types of dermatitis, wherein, not uniformally but occasionally, one obtains a rather favorable result, it would seem that both the local and systemic aspects contribute. In those cases in which, as in the irradiation of a portion of the skin improvement and clearing simultaneously occur in non-irradiated areas, one must consider the possible systemic influence. And there are a few cases of recurring eczemas, sensitization affairs, associated with asthma, or hay fever, in which irradiation given for one of these other symptoms, has resulted in the lessening of subsequent eczematous attacks, and in some cases the eczema has even ceased entirely.

We have not been submitting our clinical observations to consistent parallel laboratory checking sufficiently long to justify any final conclusions; but we are definitely impressed,

*Read at sixth annual meeting, American College of Physical Therapy, Chicago, Nov. 3, 1927.

from the number of blood chemistry estimations, that calcium and phosphorus are two elements noticeably modified. In many instances the changes, we believe, are not quantitative, but have reference to their physio-chemical balance. If there is a diminished quantity it may thus be replenished; but often the improvement is independent of any obvious quantitative change, or it is all out of proportion to such change. What vitamines are, or whether they exist at all, as seems to be doubted in some quarters, I do not know; but the effects with which they are credited apparently take place following, and as a result of, ultra violet irradiation. Erythrocytes are increased in some cases as a direct or an indirect effect. It seems that an increased oxygenization could take place only by means of the increased oxygen carrying capacity of erythrocytes, either individually or through increased numbers. Perhaps in some instances there is endocrinal stimulation and improved metabolism through the mysterious interaction of these secretions. This last suggestion could well be made the basis of a careful study.

The remainder of this paper deals with only a few skin diseases. Ultra violet light, so far as my limited experience enables me to say, is of no value in a great many skin ailments. We have tried it without favorable consequences in some conditions wherein others assert that their results were good. For examples: icthyosis, common warts, vitiligo, and epidermolysis bullosa. In psoriasis, eczema, particularly acute and weeping types, if there is not much infiltration, and in acne vulgaris, varicose ulcers with associated dermatitis, nevi, lichen planus, and a few other conditions, I find that, while often it is not as valuable as the x ray, it still is very useful. Its greatest utility in my hands, I believe, is in scalp conditions, where sufficient x ray is inadvisable. The water cooled lamp is the method of choice in vascular nevi, the port wine type, in the very young. It is not so uniformally good in older individuals. In the acute and chronic reactions following excessive use of x ray or radium we find it of great value. It is very useful in some cases of generalized pruritis. In several instances of chronic urticaria we have given ultra violet universally applied, the major credit for perfect recoveries. In ivy poisoning, generalized arsencial dedrmatitis, and such moist and itching conditions, I believe it has reduced the pruritis, dried the areas, and very definitely promoted recovery. As I have stated, for common warts it is of no value to me. But I believe for the so-called verruca plana juvenilis it has been of distinct advantage. In scalp conditions, as seborrhea and psoriasis, while it is not ideal, the water cooled lamp often does much good. Alopecia areata is doubtlessly benefited by it, if the right technique is employed. The same may be said of the loss of hair following infections and severe illness. It may be coincidental, but I have used it on several cases of impetigo contagiosa with results that were pronounced gratifying. Other infections may do as well, but our results have not been startling. In a case of erythema multiforme I secured immediately favorable results, both on the dermatitis and the associated rheumatism. The condition had been reappearing each spring and fall, but has not appeared within the two years since this method of treatment was employed. This is probably a coincidence.

It must be emphasized that in some skin conditions ultra violet rays are distinctly harmful, as for example, those in which the skin is sensitized to actinic rays and in such diseases as xeroderma pigmentosum.

This paper does not attempt to deal with the subject of technic as applied to individual diseases. But the suggestion is made that this is a most important consideration for satisfactory results. The physician must have some comprehension of the physics involved. He must learn through training and experience what he may expect from the agent which he has. It is absolutely imperative that a study be made of the existing pathology. And he must acquaint himself as far as possible with the nature of the changes which he expects to produce in order to cure the disease under treatment. In general, each condition would seem to require the production of a certain physiological state, but this is not universally true.

Furthermore, this paper does not attempt to differentiate as to the relative value in the treatment of skin conditions of the various ultra violet ray lengths. In our own experience we have

always used the mercury vapor arc lamp of the ordinary standard make. We assume that the rays emitted are within the so-called "near" and "middle" ultra violet areas.

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DISCUSSION

Dr. Collins (Chicago, Ill.): In the matter of pruritis ani, I have a suggestion to make in regard to the management of it, and it is this: The effect of your ultra violet ray can be greatly intensified by preceding it with about two or three very soft doses of x ray. By a soft x ray I mean a dosage of x ray with no filter, with about a three inch backup spark gap, three milliamperes of current, not to exceed two to three minutes in time, and not to exceed three doses, a week apart. This will lay the foundation for the absorption of your deposits, a mild stimulation. It will stop the itching. You can then finish up with the ultra violet ray much better.

One other thought in regard to pruritis is that it is not always an external condition. It is very often from higher up. If you find you are not getting results, investigate further. You will sometimes find your trouble inside the area. A colitis may be the primary cause. Therefore why treat the external condition until you have attended to the proctitis or colitis which may be the preliminary condition.

Dr. Lester Hollander (Pittsburgh): I want to discuss the last speaker's remarks especially in view of the fact that with some of them I agree very definitely and others I disagree with most heartily.

The question of pruritis ani, of course, is in most instances not a local condition, and before you go on with determining what you are going to do you had better find out what the exact conditions are that you are going to treat.

Pruritis ani is quite a large subject, and the work which was advanced three or four years ago would make one realize that more so than ever before.

I have had three or four cases of pruritis that didn't clear up until antispecific medication was given in spite of negative Wassermanns and with negative findings, so that when you are beginning to treat pruritis ani, you must practically scour the entire scope of medicine in order to make a proper diagnosis. On that point, I agree very heartily with what the previous speaker has said, but when he begins to speak about a soft dose of x ray for two or three minutes, as indefinitely as he did, I absolutely disagree with him because the only value in x ray, the only value in the work that has been done by Dr. McKee and his associates is knowing what you are doing, knowing the amount of x ray you are giving. An indefinite amount of x ray is much better left alone. The disastrous results that follow have been proven to be detrimental to the patient.

The indirect method of estimating x ray is on such a basis today that any one with common, ordinary intelligence ought to be able to give an x ray dose and repeat it definitely. When you speak of an x ray dose which you give either for two or three minutes, you are speaking of two different doses, you are not speaking of the same dose. In one instance you are giving one-third less or one-third more, depending on whether you give two or three minutes of this particular amount of energy. We know what x ray burns will do, and we know what indefinite amounts of x ray dosages have done before. To be fair to the individuals who use x ray, and certainly to the patients, indefinite amounts of x ray should not be used. Anybody who can't master the fractional, or indirect, method as described by Dr. McKee, of New York, has no right, in my estimation, even to turn on an electric switch.

Special care should be taken around the perineum where the tissues have not been accustomed to actinic rays, and where the reaction is much more severe as a matter of fact than on any other part of the body.

The use of ultra violet ray following x ray, to my mind, is a dangerous proposition because we know that with x ray we are not supposed to use any irritants, anything that is going to cause as much of an inflammation as ultra violet rays do. Again I must refer to Dr. McKee's work in speaking about the use of ultra violet in the treatment of x ray burns in which he definitely states that not only is the ultra violet ray not an antidote to x ray, but in a great many cases it increases the reaction from x ray.

So let's get back to the original point I made, the point that I stressed yesterday, and the point that is being stressed by all x ray workers in surface therapy. We have at our hands methods of measurement, and by all means use them. If we are going to assume the attitude of a scientific body I believe that is one thing we can do. If we can't be scientific, at least let's be practical, and the practical thing is to know what we are doing and what we are giving.

Dr. F. L. Nelson (Ottumwa, Iowa): I can't help calling down our late friend a little on the line of Dr. Norris who spoke previously. I have had quite a little experience on the same line Dr. Norris has mapped out, and I can assure you that line of treatment has been extremely successful. That is why I spoke to him in regard to it. I can't help saying a word about our last speaker.

His undue emphasis on the measurement on the outline given by Dr. Norris was entirely below the

erythema dose and therefore could not possibly do any harm, and especially stressed that this was given simply to shape the tissues for absorption of the stimulation. He is not doing anything that could possibly harm that patient because he is giving only a soft ray exposure.

Our friend was excited, I think in taking up that line and criticising Dr. Norris, not that I know Dr. Collins, but I have his same outline and use exactly the same work myself.

He spoke about the measures which we, of course, are familiar with but at the same time Dr. Norris' work applies a good deal to what we call the average man, the average practitioner. Of course we don't all beckon from the mountain top of great achievement like our last friend. A lot of us dwell in the mists of the valley and therefore we do not have our measurements at all times just at the finger tips. I would like to uphold Dr. Norris in his remarks.

Dr. E. Brunson (Ganges, Mich.): I should like to ask Dr. Norris how far he had this x ray from the patient, how far he had the tube and if the common Coolidge tube would be safe to use. We generally use it simply for taking pictures.

Dr. C. D. Collins (Chicago, Ill.): Ten inches, doctor, and the doses I spoke of as 3-3-3 are a week apart. Ten inch distance, three inch back up.

Dr. H. D. Holman (Mason City, Iowa): Referring to rectal diseases, pruritis ani, a very good man referred a case to me and he had given these doses of x ray and asked me if I would give ultra violet. After I had given ultra violet I asked the doctor if he had thought of using Cassia bark. This patient was an adult. He said he hadn't thought of anything of that kind, and I used several doses of Cassia bark because the man had pin worms. He thought the ultra violet cured him but it was the administration of the drug

Dr. J. J. Eller (New York City): I should like to substantiate what Dr. Hollander has said with reference to the ultra violet radiation on skin that has been x rayed previously. Some experiments were done in the clinic in New York to find out whether the effect was lessened or aggravated by the use of ultra violet rays, and we applied the ultra violet rays to a scalp which had had an epilation dose. The usual time for an epilation following x ray therapy, the one unit dose of the five areas, the Adams and Keinback method, is that the hair falls in about seventeen days. We epilated about 3,000 cases, and in the average case the hair began to fall out very profusely in seventeen days.

When we applied marked erythema doses of ultra violet rays to these areas we expected, after reading the literature, that the length of time for the falling of the hair would be longer than that or else there might not be any epilation. Instead of that, we found that the hair fell out in ten or twelve days, so that the effect of the x rays was intensified instead of lessened.

Dr. Claude B. Norris (Youngstown, Ohio): One gentleman asked about the treatment of pruritis ani, and wanted to know about the diagnosis. I believe the burden of my paper was largely emphasis upon the fact, that before proceeding, it is always advisable to try to find out all you can concerning the condition you are going to treat. After that you may not choose to use ultra violet in any form.

On the other hand, if the condition is free from hemorrhoids, and if there is no systemic involvement, an effort may be made to treat it with the ultra violet although I very much prefer to use the x ray. However, I wish to emphasize this point, that I do not use the x ray nor the ultra violet, exclusively.

We should remember that we often find it advisable to empl[illegible] physical agents in conjunction with other therapy.

I correct the constipation which is largely associated with it, if I can. I use local astringents and caustics, as strong silver nitrate or pure carbolic acid, and in addition to that I may use the water-cooled mercury arc lamp with the applicator which could be properly applied for a length of time necessary to produce the lower phase of the first degree reaction

Regarding the use of ultra violet in psoriasis. I doubt if it is worth while taking up your time in attempting to explain my technic in the use of ultra violet for psoriasis for the reason that I have no special technic. I sometimes use the water-cooled mercury arc lamp under pressure to the individual lesions.

I was glad to hear Dr. Hollender and Dr. Eller, in agreement, question the advisability of any indefinite amount as to the dosage of x ray.

A thing that I believe we overlook in our measurements of x ray dosage is this: That we have an arbitrary standard of x ray dosage which in general works, but that there are individuals with skins which may react more pronouncedly to the standardized dose.

I am going to add that Dr. George McKee has published a monumental work which I commend to everyone who uses x ray on the skin. He has done more than any other in standardizing and making x ray safe.

INFECTIONS AND TOXEMIA OF THE BILIARY TRACT WITH MEDICAL AND PHYSICAL THERAPY TREATMENT*

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When I chose this subject I believed it was one which was going to be fairly easy to present as I have had considerable experience in gall bladder and liver cases with good results, but I find that although I have given the matter considerable thought for years that many of my ideas for the effect in my treatment must be based on theory in a good many instances. There is one nice thing about theory, when you advance a theory in medicine someone gets busy and trys to prove you wrong and in that way we progress, so maybe we may progress from this paper and in another year I may believe different than I do now. This paper is going to be presented on an analytical basis of thought. I will build up and tear down to show why we come to certain conclusions.

I am going to refresh your memory a little on some of the physiology of the biliary tract which I need to give you in order to advance some of my theories in the treatment. I want you to thoroughly understand that I am not going to take up all the physiology of the biliary system. "Bile Acids" is the name given to two organic acids, glycocholic and taurocholic which are always present in the bile and they occur in the form of their respective sodium salts. Cholic acid is formed in the decomposition of each acid and we may consider the bile acids as compounds produced by the synthetic union of cholic acid with glycin in the one case and with taurin in the other. A circumstance of considerable physiological significance is that these acids or their decomposition products are absorbed in part from the intestine and are again secreted by the liver, as in the case of the pigments, there is an intestinal hepatic circulation. They serve as a menstruum for dissolving the cholesterin which is constantly present in the bile and which is an excretion to be removed. It is assumed that cholesterin is not formed in the liver but that it is eliminated by the liver cells from the blood. That it is an excretion is indicated by the fact that it is eliminated in the feces, but here again the opposite view has been that the cholesterin is in part at least reabsorbed and used again in the formation of new tissue Cholesterin is insoluble in water or in dilute saline liquids, and is held in the bile by means of bile acids.

The secretion of bile is continuous but varies under different conditions. The metabolic processes in the liver cells which produce the secretion probably goes on at all times, but they are increased when the blood flow is increased. We may believe therefore that the quantity of the bile secretion varies with the quantity and composition of the blood flowing through the liver (any agent that causes a hemolysis of red corpuscles increases the flow of bile). Although the bile is formed more or less continuously, it enters the duodenum periodically during the time of digestion. The secretion during the intervening periods is prevented from entering the duodenum apparently by the fact that the opening of the common bile duct is closed by a sphincter muscle. The secretion therefore backs up into the gall bladder. When the flow of the bile is prevented by pathological changes the bile eventually gets into the blood, producing a condition known as jaundice or icterus. There has been much discussion as to whether the bile is absorbed directly into the blood from the liver cells or whether it is carried to the blood by way of the lymph vessels. The increased pressure in the bile system leads possibly to a rupture of the delicate bile capillaries and the bile thus escapes into the lymph spaces. Bile is of importance as an excretion in that it removes from the body waste products of metabolism, such as cholesterin lecithin and bile pigments.

Having refreshed your minds in regard to a small portion of the physiology of the biliary tract we will now turn to some of the pathology which takes place in that region in the course of disease. Although pathologically there may be a difference in the destruction of liver cells, etc.,

*Read at sixth annual meeting, American College of Physical Therapy, Chicago, Nov. 3, 1927.

in the different diseases a great many of them must be due to somewhat the same physiological or chemical disturbance because by using the same kind of medical treatment aided by the application of diathermy a great many of these cases which are different pathologically are relieved of their symptoms and feel well. The only difference in a great portion of the different pathology that concerns us as physical therapists is in the length of time which the different pathological conditions require before we can cause the normal physiological and chemical reactions to take place and the patients be relieved. As an example you would not expect a cirrhosis to be relieved in the same length of time as an acute catarrhal condition, and yet I believe that if we persist in our treatment for a year to a year and one-half, in a good many instances of cirrhosis we can bring about a structural change in the liver which is of great benefit to the patient, and from the results obtained by the disappearance of the patient's symptoms we are lead to believe that we have brought about some structural change in the liver itself so that again it is performing its normal function.

We have to take into consideration two kinds of obstruction in the biliary tract, that which takes place in the gall bladder and its ducts and which is usually caused by stone, and the obstruction which takes place in the bile circulation within the liver itself and which is due usually to some catarrhal infection going on in the liver. When we talk of pathology we are talking about two kinds, antemortem and postmortem, that which is studied on account of the death of the patient and the other by specimens from the living that comes from the surgeon's operating table. I am taking for granted that the most of you are physical therapists so I believe you are going to get my idea. Dealing with those two kinds of specimens of pathology we can only get our specimens one at a time in the course of the disease, if many diseases are due to toxemias or poisons from some functional disturbance which retains the poison in the blood circulation and the cells are bathed in this poison which is retained in the blood stream, naturally we are going to get a destruction of body cells and their normal functional duty is going to be hindered if not totally destroyed. We may understand our pathology of certain diseases where that pathology has been carried on to the extent that it causes death or operation but how about the pathology in those cases in whom we diagnose a certain disease and then they recover. We absolutely must use theory in the explanation of why our treatment caused recovery or our diagnosis was wrong, or else electrotherapy in some instances must cause regeneration of tissue.

We must take up the pathology specifically of one thing and that is biliary calculi. They are found usually in the gall bladder, sometimes in the hepatic, cystic and common ducts, less frequently in the small ducts of the liver. They may be composed of:

1. Principally of cholesterin.
2. Cholesterin, bile pigment and salts of calcium and magnesium.
3. Principally, of bile pigment.
4. Rarely calcium carbonate.

Most calculi are formed around a central mass sometimes called a nucleus, which may consist of cholesterin, bile pigment, mucous or epithelium, or more rarely some foreign body.

In the physiology there is one statement on which I am going to base many of my ideas why we get results in many diseases of the biliary tract by use of the same medical and physical therapy treatment although the pathology appears different. "Any agent that causes a hemolysis of red corpuscles increases the flow of bile." I will now enlarge upon that statement and say any agent that causes a hemolysis of red corpuscles increases the flow of bile therefore any disease or toxemia which causes a disturbance in the circulatory system must react on the biliary tract or visa versa any disease of the biliary tract which hinders the flow of bile must act or cause a toxemia in the circulatory system which is going to have an effect on the rest of the body. In normal metabolism we have a hemolysis of red corpuscles going on at all times, and in disease the hemolysis is simply increased. Did you ever stop and think how many different diseases of infection or toxemia of the body with a few minor

changes of drugs we treat in about the same manner and can you not now understand where chemically a loss or increase of certain salts can account for our difference in pathology of this tract or other organs of the body? Our physiology also taught us that there is a hepatic intestinal circulation and therefore we have to stop and think and then realize that every intestinal toxemia, even constipation, must have a marked action on the biliary tract, and I believe it has been quite generally accepted that cholelithasis is more common in people who are constipated than in those who are not.

It is only recently that we have found that pernicious anemia cases are greatly relieved by feeding with liver, often a recovery. We have heard of a few cases here and there for years who, through diet and elimination, also made a recovery. At the time of the preparation of this article all the writings of this subject have contained something generally in regard to bile but I have yet to see an article mention the cholesterin of the bile. I am going to give you the definition given in Dorland's Medical Dictionary for cholesterin: "A fat like pearly substance found in gall stones, bile and nerve substance. It is said to have the power of neutralizing snake-venoms and of immunizing against them." I suppose he means that if a snake bitten person is given an extra large dose of cholesterin it neutralizes the snake venom, therefore cholesterin in the body must have the function of neutralizing the poisons eliminated in the process of metabolism, and if the proper amount of cholesterin is forced to neutralize these poisons the body remains in a state of health as long as the poisons are rapidly eliminated, or neutralized, but supposing there is not enough cholesterin formed due to errors of diet and living, these poisons would not be neutralized but retained in the blood stream, and if this condition is prolonged, then our pathology of different diseases begins, and unless relieved, goes on to the destruction of the body cells, and this destruction of cells naturally takes place in the organs of the body where the most vital functions are taking place. I have a theory which is hard to express so that my meaning may be clear and I hope that I am about to express this thought so that you may receive the idea to think about it from my view point. Are certain diseases the cause of pathological changes in the blood or bile, or are the lack of elimination of certain poisons in the system bathing the body cells over a prolonged period of time the cause of certain pathological changes in the different organs, and therefore named by us a certain disease according to the organ where this pathological change takes place? I want to stress this point by a little sketch and a few explanations. Degeneration of these cells in different organs called certain diseases. What causes these degenerations, something wrong in the gland itself or being bathed by some poisons in the blood stream which poison originates somewhere else in the body? Example, four entirely different so-called diseases.

LUNGS:

Acute Infections—Pneumonia as example, gives off a poison with increase in fibrin in blood. Liver congested due to back pressure of blood. Liver in state of stasis and proper neutralization of poisons not taking place. Kidney becomes involved and albumen appears in urine in some cases. Cases properly eliminated according to my observation show none of these symptoms even to excessive amount of fibrin in blood.

PANCREAS:

Degeneration of the Islands of Langerhans causes sugar to appear in the urine. Kidney, however is not primarily involved. Liver has much to do in sugar digestion. In case of diabetes we do not accuse the kidney and we do not know what causes the degeneration in the Island of Langerhans.

LIVER:

Largest internal secretory and excretory gland in body.

KIDNEYS

Nephritis—primarily to my mind is not a disease but a symptom of something wrong in protein metabolism. Albumen can be made to disappear from the urine in many cases by diet and elimination and later the patient has no trouble when he breaks his diet. The kidney is not a digestive gland so why should the albumen disappear from the urine due to diet and elimination if the kidneys were primarily involved. It simply excretes what it finds in the blood that is not needed. Again I believe we can lay at the door of the liver much of our trouble.

Mercury Poisoning—Have strong poison with marked destruction of tissue. Have same symptoms you have in certain diseases but more marked and same pathological changes. Therefore pathology would show that other diseases must be due to some toxemia or mild body poison.

Each gland or organ has some special function to perform. If the blood should for some reason increase or decrease a certain salt or substance in its content, it might be that this salt or substance is what this gland or organ needs to perform its function and when it does not get it, the cells of the organ may degenerate or maybe some certain poison or overproduction of certain salts in the blood stream causes certain cells to overfunctionate and kills them. You know how tired you would get working all the time without any rest, day in and day out to accomplish a job which you cannot quite ever get done. Yet these body cells are working at all times whether we sleep or wake.

We know that the character of the blood is changed as it passes through the lungs, that CO_2 is given off and that oxygen is picked up. Taking this into consideration there must be a difference in our blood, that is, some change in character or constituency as it leaves each different vital organ or gland. It has either decreased or increased some salt or other substance, therefore we should be able to say as it passes through the organs of excretion it has lost something and as it passes through the organs or glands of internal secretion it has gained something if that gland is properly functionating. Therefore if the gland is not properly functionating we have a start of a toxemia, and when the toxemia advances far enough we have a degeneration of cells taking place, maybe not in this gland itself but in some other gland remotely situated be cause it does not get the proper secretion in the blood that it needs to perform its special function on account of gland No. 1. I bring this point in to show that our blood probably does not have the same constituency in any two places in the body. Accordingly if our blood is not the same constituency anywhere in the body does it not seem plausible when performing experiments that chemical reactions take place in these different glands which we can tell nothing about according to what we find in the surface blood. The liver is both an internal secreting and excretory gland and I believe that there are chemical reactions taking place in this organ and it can do things which we can not do in a laboratory. Chemically in the laboratory we can combine two salts, or we can put two chemicals together which do not combine, but in the body these two reactions are intermingled. Chemicals are held in suspension and others are combined in the same place and at the same time. In the laboratory when you combine two chemicals you know the beginning chemicals and the end results, but you do not know how many reactions may occur between the combination of the two chemicals in the flash of a second before the end result is obtained.

So far I have said nothing about acute catarrhal infections of the biliary system and I do not believe we need mention them very much except in their treatment for we all understand that any organ of the body in which an infectious condition is present is limited in its function until that condition is relieved.

Having prepared the way with certain theories and facts I now have to bring before you a few of the diseases which I believe are caused in the beginning by some functional disturbance in the biliary system and which, when allowed to go on, cause a marked pathological change to take place in some of the cells of the body.

Considering toxemias and infections as I have, what diseases might be involved? Cholocystitis, with and without stone, congestion of the liver, acute yellow atrophy, cirrhrosis of the liver, acute pancreatitis, chronic pancreatitis, diabetes, pernicious anemia, chlorosis, certain gastric disturbances, etc., and personally I believe some functional disturbance of lack of elimination or over secretion of certain salts by the biliary system over a prolonged period of time has much to do with the development of cancer plus a secondary irritation, nephritis.

First I want to digress for a minute to some of the treatments that have been quite generally accepted. Surgical drainage for cholocystitis. Why should this be done when we have a normal opening at the other end of the gall bladder which normally drains the gall bladder secretion into the intestinal tract?. We should try and make the normal opening do its functional duty if possible and I believe we can as I am going to explain later.

Second treatment I want to mention is duodenal lavage with Epsom salts solution. Ac-

cording to the authority for this treatment I believe that he considered Mg So_4 when passed through the stomach without coming into contact with HCL acid had an action on opening the sphincter muscle that controls the secretion from the liver and gall bladder and thus caused drainage to be more marked. I mention this treatment because some of the theory as applied coincides with what I believe in accounting for the action of some of the medicines I am going to use.

There is also something else that we must consider, which has been taught and that is a patient may have gallstones for a long period of years without symptoms unless the gall bladder becomes infected and an inflammatory condition is set up.

In discussing treatment I am going to limit myself to one disease although I know that this same treatment has markedly beneficial results with a few minor changes in many diseases involving the biliary system. The disease I have picked I believe is one of the most common and the most rapidly relieved in most instances, cholecystitis with and without stones.

In consideraing treatment I will briefly outline first principally the things to which we have to give the most serious thought in order to get the best results.

1. Principally the patient.
2. Action of diathermy current or biterminal application of a high frequency current.
3. Action of medicine.
4. Diet and elimination.

I placed the patient first on the list because it is according to how much help you get from him as to whether or not you are going to get a good result or bad. Most patients the minute they are relieved of their pain decide in their own mind they are well and within two or three weeks stop taking treatment, in some instances, quit their medicine and forget your carefully made out diet list. That is where the surgeon has better control of the case than the physical therapist because as long as the wound keeps draining bile the patient knows he is not well and acts accordingly. So that the first thing to do is impress on their minds that even though their pain disappears you want them to follow your directions and advice for about three months at least.

Secondly I placed the action of the diathermy or the biterminal high frequency current. You make your application of the active electrode directly over the gall bladder region and inactive or larger electrode to the back. The diathermy current is supposedly a penetrating heat, if used to a tolerant heat over the gall bladder, according to the physiology of the action of heat it must increase the amount of blood passing through the liver and gall bladder region and therefore its application must increase the flow of bile and with the increase in the flow of bile, according to our physiology, the waste products from the body should be more rapidly removed from the blood. An increase in blood congestion also causes an increase in the leukocytes to combat infection. You must also take into consideration that maybe the passage of the electrical ions themselves in the form of high frequency may have some stimulatory effect on the muscular walls of the gall bladder and ducts and cause chemical reactions to take place more rapidly and more readily. The diathermy treatment is used for a period of at least twenty minutes two or three times a week.

Thirdly we take up the action of the different medicines. All cases are started by giving them six ounces of olive oil on an empty stomach. Olive oil is broken down in the intestinal tract into fatty acids and glycerol which is absorbed from the intestinal tract by means of the lymph system. Cholesterin, which is one of the principal constituents of gall stones, is more readily dissolved by oils than by either alkalies or acids. Two hours after the olive oil the patient is given two or three tablespoonsful of Epsom salts dissolved in water. From this dose we get two or three actions, maybe. One, its action of dilating or relaxing the sphincter muscle of the duct which shuts off the bile from the duodenum, second, the osmotic or drawing quality of all salts solutions on the secretions of the tissue; third, free watery stool and elimination.

Everything follows the path of least resistance so from this large dose of salts why should we not have an increased tendency for the bile flow to be drained down the duct into the small intestine for there should be at this time a marked osmotic attraction and bile is a fluid which could dilute the concentrated action of the salts.

The oil and salts are given about once a week or every ten days, rarely oftener, and from six weeks to three months or more depending on the patient's symptoms.

Between the periods of oils and salts the patient is given doses of medicine derived from the formula of the bitter waters of Europe, especially those of Bohemia, as determined by actual chemical analysis of these waters and fortified by the addition of magnesium sulphate. These preparations are put out by different chemical houses and the one I use is given in teaspoonful doses in a half glass of water four times a day. From the bitter waters you simply get a milder, more or less continuous salt action.

I also have a tablet composed of phenolpthalein grs. ½, Sodii Salysilate grs. 1, Ext. Cascara Sagrada ½ gr., Soda Glyco-Taurocholate grs. 1, Menthol ½ grs. of which I give one or two with a glass of water q 4hr. Soda Taurocholate is one of the salts of the bile acids so if I am getting the action I believe I am due to the intestinal hepatic circulation we are supposedly getting an increase of this salt in the bile.

Fourth I put diet and elimination. We already have marked elimination from the medicine but I also give a two or three quart bowel wash of cool water two or three times weekly. There is a lot of pro and con as to the value of bowel washes and their action but we wash our face and hands several times a day so I am on the side of the question that I cannot see where a wash of the colon can do anything but good.

Diet I am going to take up very briefly except to state that I believe strongly in those diets which separate the starches from the proteins, with principally a fresh fruit breakfast. However I wish to state that each time following the large doses of salts and oils the patients are allowed nothing to eat for two or three days, but allowed to drink all the fresh fruit juices and water they want. I believe you will also find that certain cases get well faster by increasing the protein intake and decreasing the starches while others show marked improvement by decreasing the protein intake and increasing the starches.

With the above treatment outlined most cases of cholecystitis apparently get well and many with cholithasis lose their periodic attacks of pain and have no symptoms of return. I have several patients now who have had no return of pains for a period of seven years, so I believe the above treatment caused something to occur to the stones.

In conclusion let me state that I do not ask you to believe any of the theories in this article and take them as facts, for all theories are simply as a man thinks and he builds his theories according to prove why he thinks that way. In medicine we are dealing with life and we do not know what life is, therefore every medical paper or book that has ever been published deals mostly with theory. Given any disease and explain why you use a certain medicine in that disease and you are explaining by theory. Many theories have been handed down to us in medicine for so long that we now accept them as facts. Many of these facts have been given to us by laboratory men who in their explanation forgot that in the presence of life the action may be entirely different. Twentieth century intellect has progressed from the fifteenth century according to the things we see around us, but yet in much of our medicine we still believe and do as they did centuries before us, and accept their explanation for granted. When you have been taught something it is hard to get away from that teaching. Today we have radio-activity to take into consideration in the action of our medicine. Physics has developed and electrical therapy is beginning, so why should we accept the theories of our predecessors who knew nothing of radio-activity, electrical therapy and not as much about physics as we do. Yet today when any person ad-

vances a new theory let us remember Harvey. He was not insane but rather judged by intellect that at his time had not advanced as far as his. Let us teach ourselves to judge everything with an open mind and medicine will progress more rapidly. Intelligent criticism and competition creates progress, unintelligent criticism and lack of competition destroys progress. In advancing new theories in medicine we are like big business, we are creating competition, but when we only allow ourselves to think as we have been taught and cannot have thoughts and theories in explaining certain things different than those which have been taught us we are destroying intelligent competition and progress is hindered or at a standstill. I am gong to set down one rule: theories old or new in medicine, even though accepted as correct can never be proved absolutely as correct until we know what activates life and all the processes of life.

DISCUSSION

Dr. Luther A. Tarbell (Battle Creek, Mich.): I find this paper very stimulating and very interesting.

At the sanatorium in Battle Creek we have a great many chronic cases and we also have been using diathermy with very satisfactory results in a great many of our chronic cases, and in a few acute cases we have succeeded very well.

His idea with regard to epsom salts with diathermy is something we have had some experience with as you know. We do a great deal of biliary drainage. To my own way of thinking perhaps we do too much. In some cases by giving epsom salts through the tube we are able to get biliary bile, and where that does not work we often find that an application of diathermy following, will get the bile when otherwise we are not able to get it.

Dr. B. H. Sherman (Dexter, Iowa): We had a case that has had two operations covering a period of twelve years. In the first the biliary tract was drained, and in the latter the gallbladder was removed. The attacks returned in due time after a period of five or six years and have become increasingly worse. It had gotten to a place where this patient required one grain of morphine to relieve these attacks which, in my estimation is getting into dangerous territory. One grain would have to be repeated in five or six hours in order to keep the patient from screaming and having most severe pain. We thought we had arrived at about the place where we were going to have a habit produced and in the face of this I was called to this patient.

We applied diathermy, and to my surprise that was the last of the morphine and since that time she has had one attack which yielded to two treatments of diathermy. We followed it up over a period of weeks the first time because we could hardly get rid of the patient. She was afraid the pain was going to come back. The second attack, I believe, we gave two treatments and she has had no further recurrence.

Dr. H. M. Johnson (Closing): You will notice I placed cancer in toxemias and I want to leave a little thought on this subject. "If cancer were infectious we should find it as prevalant in youth as in adult life. But from this analysis we get another thought. We are born as babies and we grow to adult life, when all growth ceases; therefore, in this process of metabolism there must be certain salts or chemicals manufactured in the body which causes cell growth and at the time we reach adult life there must be some change in the body metabolism which causes these chemicals that cause cell growth to cease to be formed.

But supposing, due to some irritation or injury plus a toxemia, a wrong metabolism was set up, causing the salts which stimulate cell growth to be formed, then we would have, due to this wrong metabolism or toxemia, a promiscuous growth of cells in this area, or what we call cancer.

PHOTOTHERAPEUTIC FACTS AND FALLACIES*

JOSEPH E. G. WADDINGTON, M.D.
DETROIT

Phototherapy is not only an integrant part of physical therapy, but it is also an important constituent of electrotherapy, from which it cannot be restrictedly isolated, therapeutically or mechanically considered. Phototherapy not only employs the visible spectrum, extending from 3900 to 7600 A.U. and composed of the seven primary colors: violet, indigo, blue, green, yellow, orange and red, but it also more importantly utilizes the invisible spectrum at each end: the ultra violet and the infra red, respectively.

That which one can perceive visually is naturally more obvious to the understanding than the unseen; while the unseen—though not necessarily unpercieved—is also naturally more apt to be misconstrued, especially when considering therapeutic problems. Paradoxically, this applies both for and against phototherapy or—more precisely—the utilization of light, both visible and invisible, as a curative agency. The virtues mendaciously ascribed to "violet ray" by its heterogeneous promulgators and *faithfully* accepted by their ignorant proselytes, and also—mirabile dictu—either belived in or ignorantly confounded by quite a number of otherwise intelligent physicians as ultra violet, is irrefutable evidence of the necessity for scientific discussion of the facts and some of the fallicies or superstitions of phototherapy.

Practically every physician with even minimal pretentions of employing physical therapy will possess a so-called "deep therapy" or radiant light and heat lamp, drawing from 1000 to 1500 watts of current; the bulbs or glass screens employed with these and similar appliances—but of possibly smaller or even larger current consumption—may quite popularly restrict themselves in color to any one or all of those so patriotically reminiscent of our country's flag; or else—less popularity and likewise less scientifically and also less monotonously—range throughout the entire chromatic spectrum.

*Submitted in Thesis Contest, American College of Physical Therapy, Chicago, Nov. 4, 1927.

The visualized and non-visualized spectrum of light as evolved from an electrical source—irrespective of wattage or power—and from diverse resistant materials or elements, and restrictedly diffused through glass, is therapeutically dependent mainly, so far as present day research is able to determine, upon the long, penetrant wave lengths of the visible red portion and those deeply penetrant—comparatively—invisible infra red rays of maximum emission around 15,000 to 20,000 A.U. and ending at 40,000A.U. on account of the opaqueness of glass to longer wave lengths.

Water of two or three milimeters thickness is impervious to radiation of wave lengths exceeding 20,000 A.U.; and ultra violet of 3,000 to 3,650 A.U. can only penetrate through a possible ½ milimeter of skin (1). Glass is opaque to ultra-violet wave lengths below this figure: extending to 2,900 A.U., that imparts to sunlight its peculiarly valuable property of stimulating metabolism through enabling the system to appropriate *available* iron, lime and phosphorus. Longer wave lengths of ultra violet have some slight metabolic value and are also indirectly bactericidal through such constitutional or stimulant effect; however, the volume and character of ultra violet as evolved by the incandescent light bulb—no matter what its diminutive or colossal size, and description—is entirely too negligible for therapeutic consideration.

It is conceded that the blue end of the spectrum is less thermally active, and considered sedative in contrast with the red end, which is decidedly more thermal and stimulant in character; but radiation through a red, white, or blue bulb or screen practically resolves itself into a variant degree of thermal exposure and reaction, the various colors simply serving to more or less efficiently screen or confine some of the heat within the glass itself. As for the various other colored screens and shades, despite occasional exuberant and localized outbursts of enthusiasm, there is no reliable clinical or labora-

tory evidence as to their value—beyond a possibly psychic effect through the ocular nerve.

If one were to misguidedly ascribe sedative or hypnotic properties to a generous dose of castor oil, it would be no disparagement to the well recognized relaxant effects of the drug to disprove such spurious and injurious claims. Similarly with incandescent light bulbs as well as with other forms of phototherapeutic appliances, authentic claims can only be correctly appraised at their valuable entirety by removel of all undue enthusiasm and by a dispassionate review of the physics involved and the clinical results achieved.

Infra red generators: variously composed of certain combinations of metals and non-metallic elements and compounds of highly resistant heating quality, have recently taken their place, if not in the sun, at least in the phototherapeutic spectrum. It is quite generally stated and popularly believed that the radiation from these generators or elements is of superior thermally penetrant character to that emitted from a "deep therapy" or incandescent light bulb. Different elements possess variant degrees of resistance to the electrical current and thus vary in degree of heat and concomitant degree of incandescence upon which the qualitative wave length of infra red is so essentially dependent.

The longer the infra red waves the less deeply penetrant. The gas filled tungsten bulb —as familiarly recognized in the 1000 and 1500 watt radiant light and heat or "deep therapy" lamps emits a comparatively large amount of somewhat deeply penetrative infra red but in conjunction with a rather high percentage of visible radiations which are more or less irritant to the peripheral nerve endings of the skin; additionally, there is about 11% of exceedingly long wave length energy—mostly above 90,000 A. U.—which is emitted at a comparatively low temperature from the glass bulb itself (2). This combination of convective heat, deeply penetrant, and negligibly penetrant infra red radiation is found in practice to be of such an irritantly thermal character as to greatly restrict or invalidate the otherwise valuably indicated employment of such type radiation.

The wave length of the infra red generators varyingly depends upon the character of element used and the degree of heat to which it resistantly responds. Not being glass enclosed, and its visible radiation being strictly limited to the red portion of the spectrum, and—preferably—restricting its greatest proportion of infra red energy below 50,000 A.U. with only a negligible amount extending to a possible limit of less than double this figure, one should therefrom obtain very little convective heat and yet be assured of a qualitative radiation that can be reasonably supposed capable of non-irritantly penetrating deeply enough through the skin to at least reach the net work of superficial capillaries; the resultant conversive heat will then automatically in turn be carried into the deeper tissues of the body. This circulatory absorption and sequent transfer of infra red energy might be correctly recognized as a mild interior combination of conversive and convective heating.

Herein apparently lies the distinctive difference between radiation from a glass enclosed filament and from an infra red radiator. If quick, intensive and superficial thermal reaction be indicated, then some type of incandescent light bulb may be conveniently used. For slower but more sustained and penetrant heat, an infra red generator of correct type should be more correctly indicated.

For erysipelas, otitis media, sinusitis, myalgias, various dermatoses, and many other similar and dissimilar conditions where hyperemia is physiologically and therapeutically indicated, it is a sustained and not temporary circulatory stimulation that is preminently requisite, and treatment should not be of the all too popular one-half hour or even hour sample duration but kept up more or less unremittently for hours and even days as necessitated by the exigency of the particular case.

The following abstract from a recent article by Dr. Woodbury should inherit appreciative consideration. "The close application of a weak generator may produce a radiation equal to the use of a powerful radiator but at a greater distance. This permits the use of low wattage lamps with equal therapeutic effect to the so-called "deep therapy" lamps of 1500 watts. The

use of the latter is wasteful both of current and of radiant energy since they cannot be brought near enough to the patient and every ray not falling on the part to be treated is wasted." (3) This is quite true, and it is also equally correct that a carbon filament lamp of less than 300 watts may give equal or even more intense heat —as interpreted by skin reaction—but it is the pleasantly *conversive* degree of heat evolved that is usually the desideratum; the glass covering of any incandescent source of light and heat emits but a small per cent of non-irritant thermal wave lengths, but a large amount of convective heat which is extremely apt to become unbearable before one can obtain the desired amount of more deeply conversive radiation. It is considered probable—though not yet definitely proven—that the heat produced in human tissues by the infra red generators is to a considerable extent due to conversion of the longer visible (red) rays and shorter infra red into heat in the skin, which heat is then conducted or reradiated into the deeper tissues.

Reverting now to the opposite end of the spectrum: the precise scientific and clinical status of ultra violet is greatly obscured, not only by rival claims of the various manufacturers of a somewhat increasing variety of ultra violet emanators, apparently all substantiated by first class physicists, but rendered even more tenebrous by the vastly differing degree and quality of the radiation so exuberantly yet erratically and non-specifically prescribed and advised under the extremely indefinite catholic term: ultra violet. The wave lengths of ultra violet embraced within the limits of 3200 and 3900 A.U. appear to have been conclusively proven as those exercising the greatest therapeutic effect upon animal metabolism; wave lengths below this figure become increasingly bactericidal, antagonistic to metabolism, and increasingly superficial in penetration; above 3200 A.U. the ultra violet decreases materially as a metabolic stimulant though it is still capable of exercising some slight constitutional effect under lengthy exposure. Janet Howell Clark (4) has shown that ultra violet ranging in wave lengths from 3300 to 3900 A.U. has an extremely depressant action upon lymphocytes and only less marked upon the polymorphonuclears.

It will thus be clearly evident that ultra violet is a term that is about as explicitly definite as "electricity" or "drugs" might be. Furthermore, the sun not only radiates ultra violet of various wave lengths and in tensity, but also quite an amount of infra red shorter than 40,000 A.U.; the plain carbon arc emits in addition to its ultra violet quite an amount of infra red longer than 40,000 A. U. the quartz mercury arc evolves very little infra red of penetrable quality. Recognizing all these facts, one can very easily simplify their scientific and practical digestion by recalling that as drugs are not natural to the healthy system but are therapeutically indicated and effective in certain dosage and under certain conditions, so ultra violet of certain wave lengths and intensity, with or without a certain determined proportional dosage of infra red of certain wave lengths, may be and is quite valuably indicated and therapeutically effective when and where sunlight itself is either unobtainable or else deficient in some desired proportional degree or quality of wave length.

Bone tuberculosis is favorably acted upon by the intense heat or infra red rays of the sun at Leysin, or by radiation with a carbon arc emanating much infra red in conjunction with the ultra violet; but pulmonary tuberculosis requires less heat or infra red and more of the specifically metabolic and indirectly bactericidal ultra violet rays as emitted quite satisfactorily from the air-cooled quartz mercury arc. Certain types of sluggish ulcers, unaccompanied by any particular degree of suppuration or infection, require gentle stimulation through the hyperemic action of long infra red as emitted from an infra red generator or combined with the long metabolic rays of ultra violet as generated from a carbon arc equipped with a therapeutic "A" or "B" carbon. To favorably influence certain dermatoses of a suppurative or infectious character, the water-cooled quartz mercury arc, or a carbon arc equipped with a "C" or "K" carbon would be specifically indicated. However, one need not enthusiastically remunerate the manufacturers by collecting all of their various and varied types of phototherapy appliances, valuable as they may all be, but can—if the physics of phototherapy and of the various appliances

therein comprised be clearly appreciated—accomplish practically all desired modifications of phototherapeutic intensity and quality by expert manipulation of but a few types from among the almost innumerable aspirants for phototherapeutic favor.

In health and healthful—not too civilized—surroundings, the sun's spectrum is apparently of ultra violet, visible light and infra red; however, "It seems clear from much evidence which many records reveal that not only do radiations of different wave lengths affect different animals dissimilarly with changes in wave lengths." (5) Hence the need and value of phototherapy, and the inadequacy of one rigidly unvarying agency or integral part of same to vicariously serve all desired therapeutic purposes. Finally, it must be recognized that haphazard, ignorant application of such a potent, versatile agent for good and also evil is on a par with similarly applied surgery or drug medication.

CONCLUSIONS.

So far as present day unbiased research is able to determine, radiant light and heat lamps —whether of the tungsten or the carbon filament type, and irrespective of size—possess no particularly determinable therapeutic efficiency apart from their heat radiation. Owing to the glass enclosure, only a small per cent of effective infra red rays are emitted but—owing to this filter—a large amount of convective and irritant heat radiation is evolved.

Infra red generators, owing to their freedom from enclosing glass, are thereby enabled to emit a greater quantity and quality of non-irritant, conversive infra red or heat waves.

Whenever and wherever hyperemia of somewhat superficial degree may be indicated, some form of radiant light and heat or—preferably—infra red generator is to be thought of.

Ultra violet is a most ambiguous and elastic term, embracing as it does highly constructive and highly destructive wave lengths and also innumerable proportional combinations of ultra violet and infra red. It is therefore essential to scientific thought and practical application that the term ultra violet be invariably qualified so as to convey as nearly as possible its spectral characteristics and intensity.

Artificial phototherapy can not be compared either to the advantage or disadvantage of natural phototherapy or heliotherapy. What may be essentially of healthful or requisite for the normal individual under normal surroundings may be entirely inadequate for the abnormal person under abnormal environment, hence the value of artificial phototherapy, as it can be administered in such qualitative combination and degree of intensity as each individual case may require.

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EDITORIAL

ARCHIVES OF PHYSICAL THERAPY, X-RAY, RADIUM

PRESIDENT'S SUGGESTIONS*

Upon this occasion I most cordially thank you for the honor bestowed upon me and for the expression of your confidence. I feel deeply this honor and I hope that I am worthy and capable of carrying on the great work. I sincerely trust that I shall be able to shoulder the responsibilities of the office and serve you capably and zealously. The college is very dear to my heart, and never a day passes but that I devote at least a few moments to its cause and for its welfare. My hope is that I may come up to your expectation in the fulfilling of the duties incumbent upon the president.

Seneca, in his work, "A Happy Life," says: "He that has dedicated his mind to virtue and to the good of human society, whereof he is a member, has consummated all that is either profitable or necessary for him to know or to do toward the establishment of his peace." Paraphraseing this passage, I might say that I propose to dedicate my mind and whatever of talents I may possess to the cause you have entrusted to me, to the good of the college of which I have the honor to be president, and to consecrate my hours to virtuous effort in behalf of all.

To advance, we must have faith in ourselves. The primary function of this college is to bring together men with kindred interests, thoughts and ideals, so that they may enjoy each other's society and gain mutual benefit. We are banded together with the object that each individual may lend to the entire group the elements of strength and the talents which he possesses, and may, in turn, receive the help, inspiration and benefits of the whole organization.

Again, the power of the college lies in concerted action. Without unity and co-operation there can be no progress. The basis of unity of action lies in an individual self-mastery and self-control. We must know our limitations as well as our accomplishments. We must not claim too much for physical therapy, but keep it within the bounds of common sense and scientific medicine. We must not tear down the superstructure nor lay aside the principles upon which the whole course of medicine is founded. The basic laws of anatomy, physiology and pathology must be strictly observed, else we find ourselves wandering away from these factors which constitute the foundation of modern medicine.

Conscientious effort and education will do more than anything else to overcome our shortcomings. By education, I mean the systematic development and cultivation of the normal powers of the intellect, so as to render them more efficient in some particular form of endeavor. Efficiency in modern medicine requires character, idealism and education, as well as experience and effort. Never has there been a greater need for the exceptional, the resourceful, the one who can think and plan, who can devise new and original ways of doing things—who can handle situations and solve problems through the exercise of resourcefulness.

Back of every human action is a definite motive. The object of this august body is to further the aim of legitimate scientific medicine. It may be true that some of our members are here because of a selfish motive—I hope not. On the other hand, I do hope that they have caught a vision which causes to stir within them a keener desire for the knowledge whereby they may prepare themselves for greater responsibilities and higher efficiency. The American College of Physical Therapy is no place for the charlatan, and should one of this type creep in, I feel sure that he will soon retire, because, by edict and example, he will find himself in the midst of high-minded and virtuous physicians, and his own conscience will tell him that he is in the wrong place.

The membership of the college must be maintained on a high standard. The members must be ethical and in good standing in their local societies. They should show some evidence of knowledge of physical therapy. I have always maintained that before one can become a member be should present an acceptable thesis. We are neophytes no longer, and ample time has been had for any one seeking admission to our society to master the principles of physical therapy. It is not alone in numbers that strength is found, but in the hearts and minds and courageous efforts of those constituting the membership. Our requirements for admission should be raised and then maintained to a higher standard.

The college owes a duty to organized medicine, in that it must keep the profession clean by its high purposes and aims. It should be the business of the members to investigate the efficiency of every agency offered to the profession; those which have questionable virtue should not be tolerated, and their manufacture should be suppressed. Our membership should not give opinions to any firm or firms concerning an agency unless they have fully investigated it and substantiated the claims made for it by actual clinical results. On the other hand, the manufacturers of physical therapy apparatus should be encouraged and helped in every way to perfect any reasonable scientific apparatus, because their facilities for research are far more adequate than those of any individual. Research must be carried on, for without this progress will be delayed and formidable problems left unsolved. Organized medicine demands that we be the watch dogs, so to speak, lest some unreasonable and irrational propaganda be dealt out to the profession.

The college also owes a duty to its members in bringing before them all phases of treatment with physical therapy. The good should be isolated from the bad—the wheat separated from the chaff. The proper measures should be stressed and uniform technic observed as far as possible. It is only natural that more efficient methods will be employed by some, according to individual talents, as is the case in other branches of medicine; nevertheless, as certain standards are practiced in the various branches, it behooves us to perfect specific technic. The college also owes its members the best programs available. Physicians of high standing in this country and from abroad, should be invited to participate in our meetings. thereby giving us first-hand and authoritative information.

The college also owes a duty to the technician. As technicians are valuable adjuncts to other branches of medicine, the college should work out some plan whereby both men and women could be satisfactorily instructed to share the work and responsibility of aiding the doctor in physical therapy. Science and experience both declare that the average man or woman can be trained to do finer, bigger things than the man or woman of genius ordinarily accomplishes. With a correct knowledge of the physics of the currents and their methods of operation and application, the average layman can be taught to do routine work along this line. On the other hand, the technician has an obligation to the college to stay within the bounds of his training and not take undue advantage of his position. He should not do things on his own initiative, but only on the advice of physicians. He should not establish a business of his own, by innuendo or otherwise, but at all times be loyal to the profession and faithful to its time-honored ethics.

The college owes a duty to society as a whole, by protecting it from the charlatan and irregular practitioner. With all the new isms and "ectics," the public may be led blindly into avenues of quackery and seditious medicine. The members, by their example, should show the way of honest medicine. It should be the duty of the members to prosecute to the fullest extent those who show a disposition to commercialize human life. They should aid those in authority to secure the conviction of anyone violating the medical practice acts of their several states. The public should be warned against the irregular—ethical articles in the lay press will do it. The charlatan may flourish for a while, but in the end scientific medicine will triumph. The profession can rise no higher than the character of its members, and if the ethics and traditions of Hippocrates be cast

aside, then will the profession suffer. The members of the college should guard against this by keeping themselves spotless before the world.

Now is the time for the college to put forth its best efforts, for never was there a time when honesty in medicine was needed more than the present. Physical therapy furnishes the missing leg of the triangle of medicine and surgery. Medicine, surgery and physical therapy can, and should, go hand in hand to combat disease. There should be no rivalry between the three. We are all doctors first and then specialists in treatment. We should be honest with ourselves, and with our patients, and if the case is a surgical one, pass it on to the surgeon; if it is medical, refer it to the internist, and if it can be cured by physical agencies, apply them. Oftentimes it takes a combination of all three to obtain a happy result. Each in turn must do its part—not rob the other of its share of the glory.

As your presiding officer for the coming year, I desire the earnest co-operation and help of all of you. Many plans for the year have run through my mind. First of all, I desire harmony in our organization; lay aside any petty jealousy that you may think exists, and then let us consider a few needs of the college.

I suggest that there be established a bureau of information for the purpose of aiding our members in solving physical therapy problems. This could be composed of men who work along different lines. Have on this board one who is an authority on high frequency, another on low voltage, on the x-ray, on radium and on light. It should be the duty of these to give freely of their knowledge concerning all problems that arise involving the specialty of each.

I would also suggest the establishment of training schools for technicians; they should not be handicapped by the lack of training. Our own courses of instruction are entirely inadequate for the beginner and perhaps too short for the more experienced. To crowd all the subjects together in a few days is not sufficient training for the average technician.

I would also advise that some steps be taken looking towards a closer fellowship among the several physical therapy societies of the United States. I do not mean that I would abolish the others, but would strengthen them, and bring all those interested in physical therapy together in one great and powerful family.

Again, there should be a committee on the standardization of apparatus, whose duty it should be to investigate any and all agencies offered for sale by the various manufacturers; the merits and demerits of these should be carefully studied before condemning or commending them for use. Approvals and rejections should be published in our official journal.

We must obtain an interesting program for the next meeting—one that is not too long, but that is adequate and practical. We have always enjoyed wonderful programs in the past, and they have improved each succeeding year, but in my opinion too much time is consumed, causing crowding at the end and a limitation of free discussion. I would suggest that more time be given to social affairs, thus affording opportunity for spreading good fellowship among our members. This will also afford the timid fellow a chance to discuss his problems with those fitted to solve them. Many medical difficulties have been overcome, and some excellent solutions offered, in the alcoves of meeting halls.

Also, we must build up our official journal. Marked improvement has been made in this journal during the past year, but it must be enlarged. The editorial staff always welcomes suggestions, and as it is your publication, it is your duty to support it and improve it. Send in some case reports; write something of interest for its columns; boost it along. Let's have a broader and better journal—one which will be a credit to our college.

And finally, let us all work together for the good of humanity. It is our profession and our life work to add to the comfort of the living and to extend the span of life, if possible. I realize there are many medical problems which remain unsolved, but the conscientious physician need have no fear but that these will be met. Indeed, looking backward upon the achievements of the last decade in medicine, it needs no prophet, no seer, to predict that the next decade will revolutionize all medicine by the discovery of means to cope with some of our

most dreaded diseases. In this, physical therapy will have a large and honorable part.

FRANK WALKE, M. D.
Shreveport, La.

*Presidential address read at inauguration, the seventh annual meeting of the American College of Physical Therapy, Chicago, October 8, 1928.

SEVENTH ANNUAL MEETING

The seventh annual meeting of the American College of Physical Therapy stands out in bold relief because of several things.

The program was of unusual merit, made up of a large number of valuable papers by men from all sections of North America and climaxed by two distinguished foreign guests, Dr. Carl Sonne of the Finsen Institute, Copenhagen, and Dr. Alfred R. Friel of London. Dr. Sonne is an authority on light therapy and has had large clinical experience as well as doing much research. His presentation of the various phases of light therapy was masterful and instructive.

A. Friel, an authority on low voltage electric currents, proved himself not only an able physician, but a master teacher. Those who were privileged to hear him were greatly benefited.

At the annual business session several important actions were taken. In one of these a committee on standardization for entrance to membership in the college was appointed. This same committee was instructed to study physical therapy departments of various hospitals relative to standardization according to whether they meet certain requirements. Action was also taken abolishing the course of instruction at the 1929 annual meeting. This is in accordance with the suggestions made by the incoming president, Frank Walke, M. D., as found in his inaugural address printed elsewhere.

COUNCIL ON PHYSICAL THERAPY

OFFICIAL RULES

Object of Rules.—The following rules have been adopted by the Council on Physical Therapy of the American Medical Association primarily with the object of protecting the medical profession and the public against fraud, undesirable secrecy and objectionable advertising in connection with apparatus and methods for physical therapy.

Devices and methods that have been found acceptable as conforming to the rules of the Council will be described in an Accepted List.

The term "device for physical therapy," as defined by the Council, shall mean any device by means of which apparatus is employed for the diagnosis or treatment of disease or the promotion of health.

RULE 1. *Nature of Apparatus.*—A device will not be acceptable for inclusion in the list, or retained therein, unless a full description of its construction and of its modus operandi is furnished to the Council for publication. Working plans and specifications with photographs and blue prints shall be supplied when requested.

RULE 2. *Efficacy.*—A device or method will not be acceptable or retained unless sufficient information and satisfactory evidence of its operation and effectiveness are made available to the Council.

RULE 3. *Advertising.*—A device or method that is advertised for diagnostic purposes or as a therapeutic agent will not be accepted or retained unless the advertising material and other descriptive matter prepared for distribution to physicians or to institutions or to the public have been submitted to and accepted by the Council. The therapeutic indications and the action of the device, or method, and the dosage may be indicated, provided such statements do not suggest self-treatment.

RULE 4. *False Claims*—A device will not be acceptable or retained concerning which the manufacturer or his agents make false or misleading statements as to the nature of its construction or action.

RULE 5. *Unwarranted Therapeutic Claims.*—A device will not be acceptable or retained concerning which the manufacturer or his agents make unwarranted, exaggerated or misleading statements as to its therapeutic value.

RULE 6. *Dangers.*—The directions and the descriptive circulars accompanying a device must

state plainly the limits of safety and the possibilities of danger attending its use.

RULE 7. *Standardization.*—A device will not be accepted or retained unless it has satisfactorily passed tests under conditions acceptable to the Council.

RULE 8. *Objectionable Names.* — Proprietary names for physical therapeutic apparatus will be recognized only when the Council shall deem the use of such exclusive names to be in the interest of public welfare. Names that are misleading or suggest diseases, pathologic conditions or therapeutic indications will not be recognized. The continued use of well established or existing trade names must depend on the addition of a descriptive name on the label as the main title, with the trade name in parenthesis below the main title. After March 1, 1927, no new trade names for physiotherapeutic methodsfi systems of physical education, or apparatus for therapeutic or diagnostic use will be recognized except when they involve the application of a new physical agent, or a new essential application of a known physical agent, and otherwise comply with the rules of the Council.

RULE 9. *Patented Apparatus and Protected Names.*—If the device is patented—either the apparatus or its mode of application, or both —the number of such patent or patents must be furnished to the Council. Furthermore, if the name of a device is registered, or the label copyrighted, the registration (trademark) number and copy, of the protected label shall be furnished the Council. In case of registration in foreign countries, the name under which the device is registered should be supplied.

RULE 10. *Useless Devices.*—A device will not be acceptable or retained which, because of its unscientific construction, is useless or inimical to the best interests of the public.

RULE 11. *Policies of Firms Detrimental to Rational Therapeutics.*—The Council will not retain, if already accepted, the appliances of a firm if, in the opinion of the Council, the policies of such firm are clearly detrimental to the welfare of the public.

PACIFIC PHYSIOTHERAPY ASSOCIATION

The last meeting was held September 26 at the Hollywood Hospital. Dr. Clinton D. Hubbard of Huntington Park gave a report of his visit to European physical therapists during the past summer with the tour conducted by the American College of Physical Therapy.

ITALIAN CANCER CAMPAIGN

The first meeting of the Italian League of the Cancer Campaign was held on October 16th, at Milan. An official address was delivered by Professor Felice Perussia, of the Royal University of Milan, on the subject: "Discipline and Control of Radiotherapy of Cancer."

The first National Meeting of the Italian League of the Cancer Campaign, aware that, at present, the radiological treatment (apart from surgical intervention) necessitates an able, well-organized unit of workers, expensive material, *e. g.*, radium, and instrumentation often at present placed in surroundings not planned with this object in view, approves of the work of the Government, and of those people, public and private, who are helping to set up in Italy, special clinical centres and hospitals for the rational treatment of cancer under the best available conditions. It recognizes that even in private institutions, radiotherapy of cancer might be practiced, provided it is efficiently inspected and controlled so that patients are guaranteed treatment at the hands of specially trained and competent workers provided with the necessary instruments, and thus safe-guarded from incompetent frauds. It holds that, while recognizing the vigilant and rigid supervision of the Sanitary Authorities and the Medical Council in the cases of laws already governing Institutions and Public Sanatoria where treatment is practiced, of the denunciation of radio-active substances, protection in Radiological Departments and of the dignity and decorum of the profession in general, radiotherapy of cancer should be controlled not so much on the methods and apparatus used, or on available quantity of radio-active substances, as on the making certain of the specific competence of those who practice it. As the ideal solution it proposes intimate collaboration between

specialists and the clinic. The Meeting puts it to the vote that the standard of qualification of a Radiologist be considerably raised, and it advises that general radiology be included in the University curriculum. This would result in the new generations of doctors realizing the difficulties and dangers inherent in the radiotherapy of cancer, and so prepare them to observe with prudence and scrupulousness the progress of their patients.

THE STUDENT'S LIBRARY

BOOKS REVIEWED

OPERATIVE SURGERY. By *J. Shelton Horsley*, M.D., F.A.C.S., Attending Surgeon, St. Elizabeths Hospital, Richmond, Va. Third Edition. Cloth. Pp. 893 with 756 original illustrations by Miss Helen Lorraine. Price $15.00. C. V. Mosby Co., St. Louis, 1928.

For one to attempt a critical review of such a work would be for a disciple to pass judgment upon a master. Rather than make such a futile incongruity, I would much rather mention a few outstanding characterizations and permit the reader to be the judge. The author, co-author of American Practice of Surgery and author of Surgery of the Blood Vessels, Surgery of the Stomach and Small Intestines, and this Operative Surgery, began the practice of his profession in 1892. Serving an assistantship to Dr. John A. Wyeth of New York, he later became editor of the N. Y. Poloclinic Medical Journal. He was proprietor and surgeon-in-chief of the St Luke's Hospital at El Paso. He was professor of the principles of surgery, Medical College of Virginia, Richmond, 1903-1912, since being surgeon-in-charge at St. Elizabeth's Hospital. At our recent A. M. A. Convention he served as Chairman of the Section on Surgery, General and Abdominal.

The text in question has run into its third edition, previous copyrights having been reserved by the same company in 1921 nd 1924. Much new material has been added to this edition, including a new chapter on electrical contraction. New operations have been described: the operation of Dandy and Singleton for tic douloureau of the ninth nerve, Felix radical phrenicotomy, the operations of Cutler and Beck on the heart, cardiolysis of Marvin and Harvey, those of Saurbruch and Braur for thoracoplasty, Wheeldon for bunion, the operation of McGuire for hypospadias, the operation of Dodson for ureteral stricture, the Brown operation for cleft palate, transplantation of whole skin by Davis, and the face-lifting operations of Hunt and Miller.

To cover the field included in the subject chosen for the text would necessitate either an encyclopaedic system of surgery or for the single volume to include those conditions most familiar to the author and most practical for the general reader. Although a knowledge of anatomy is essential for operative surgery, the author lays particular stress upon the interpretation of the biologic processes that follow surgical operations and to the preservation of physiologic function. He emphasizes the difference between the operator who blindly follows anatomical landmarks, passes accurate sutures and makes beautiful dissections; and the surgeon who exterpates or corrects the pathology and retains or restores the physiology of the tissues and organs involved. Although including the essential principles of operative technic for methods used by the author for his correction of pathological defects, the most important element contained within this valuable work is the surgical judgment which he develops for the reader throughout the study. Next to a personal contact with such a great surgeon, such a text is the best substitution. If not the best, this text ranks high as a single volume on operative surgery.

AFFECTIONS OF THE STOMACH . By *Burrill B. Crohn*, M.D., Associate Attending Physician to the Mt. Sinai Hospital, New York City. Octavo of 902 pages with 361 illustrations, some in colors. Cloth. Price $10.00. Philadelphia: W. B. Saunders Co., 1927

One always wishes before scrutinizing the product of an author's labor or criticizing the makeup of the publishers, to look over the credentials of the one presenting the text for consideration. Dr. Cohn graduating from Columbia College of Physicians and Surgeons in 1902 has been particularly active in gastro-enterology. After assisting in physiological chemistry in the Mt. Sinai Hosp., 1911-21, and assisting in medicine at the

same institution 1918-21, he was appointed chief of the clinic, gastro-intestinal department of the University Hospital in 1922. Many articles on gastro-enterology have embodied this wealth of preparation. It is both fitting and proper that Affections of the Stomach should be the subject chosen or his discussion.

After discussing the histologic and gross anatomy of the stomcah, he takes us through a complete review of the physiologic experiments of Bernarde, Heidenhain, Cannon and others, including the motility and "gradient" works of Alvarez. He discusses at length the laboratory procedures-test meals and their interpretation, radiographis examinations, etc. Not too much stress is put upon the value of a gool history and complete physical examination, for the stomach we will learn is the seat of many functional and reflex disorders. These he atttempts to evacuate by considering individually various symptomatologies and laboratory findings. It is interesting to note that in presenting the subject of ulcer of the stomach and duodenum, he consumes 272 pages for etiology, symptomatology, differential diagnosis, and complications and treatment. Of the 82 pages devoted to the treatment of this malady, 16 are presented by A. A. Berg on surgical treatment. Tumors of the stomach occupy the next largest single division, including both the benign and malignant types.

Each chapter is followed by a rather complete list of references. The illustrations are good and the general makeup of the text is attractive.

Affections of the Stomach by Crohn is a complete review of our present literature on gastro-enterology presented in an unbiased manner but tinged with the results of careful study and critical observations of the author.

THE SIMPLE GOITRES. By *Robert McCarrison*, C.I.E., M.D., D.Sc., LL.D., F.R.C.P.,Associate Fellow of the College of Physicians, Philadelphia; Laureat de L'Academie de Medicine, Paris; Lieut.-Colonel Indian Medical Service; Pasteur Institute, Coonoor, S. India. Cloth. Pp. 106 with 143 illustrations. Price $4.00, New York: William Wood and Co., 1928.

After devating twenty-five years to the study of epidemiology and etiology of simple goitres, Dr. McCarrison should be considered a reliable authority on this subject. But we are not surprised at the reservations made by him in his conclusions following his report. The old saying, "the more we learn, the more we realize the less we know," holds true.

The contents of this book formed the subject matter of a report to the International Conference on Goitre held, under the auspices of the Swiss Goitre Commission, at Berne, in August, 1927. The report is now published with the permission of the Indian Research Fund Association with the addition of an introduction presenting the high lights of the physiology of the thyroid gland, the pathological physiology characterizing goitres and a brief summary of the known facts regarding the causes of simple or non-tixoc goitres.

ACTINOTHERAPY. By *H. G. Falkner*, L.R.C.S. I., L.R.C.P.I., L.M. Rot. Dub, O.B.E., Actinotherapeutist to the London Teachers' Assn., late Col., A. M. S., T. (Ret.); late O. C. Maudsley Neurological Hospital., Denmark Hill; also late Medical Officer of Health, Lynton and Dist (Devon). Cloth. Price $3.00. Pp. 152, illustrated. New York. William Wood and Co., 1927.

Few authors in their compilation of a subject seem to realize the small amount of time that the average general practitioner has to devote to medical literature. With this small amount of available time, he has at his disposal the entire field of medicine in which to delve; for the problems that have confronted him in the various branches during the day each present themselves for solution. It is this realization that stands out to the reviewer as the greatest achievement of the author. His attack of the subject has been straightforward, emitting most of the non-essential opinions that tempt and divert most writers from their goal. His book has been constructed for the general practitioner.

In the 152 pages a snappy working knowledge of actinic light is available. Introducing with a brief historical sketch, he points out the advantages of natural over artificial sunlight. The question confronting the novice as to the type of lamp most practical, when to use it and how, are all answered in turn. Some of the theory as to the physical and physiological action of the rays is included. Over half the text, however, considers technic and application of the rays.

As a quick handbook for the general practitioner, short in theory but long in practical application, this text should fill most requirements.

INTERNATIONAL ABSTRACTS

Certain Factors Militating Against Accurate Correlation of Physical and Roentgen Ray Examinations of the Chest. F. M. Pottenger, M. D. Am. J. of the Med. Sciences, May 1928.

1. The findings on physical and roentgen ray examination of the lungs show some variation in nearly all instances, and in a small percentage the differences are very marked.

2. The ability of the disease process in the lung to produce shadows depends upon the power of the various elements making up the structures to intercept the rays, and this varies approximately according to the fourth power of the atomic number of their composing elements. Therefore, on the plate, small lesions may show perfectly if composed of elements whose atomic number is high, and large ones may not show at all if the atomic number of the chief component elements is low.

3. Lesions nearest the plate (taken at a distance of 40 inches) show best, because the tissues nearest the tube are overpenetrated and consequently fail to intercept the rays and produce shadow. Therefore, there is considerable variation in plates taken anteroposteriorly compared with those taken posteroanteriorly. If a small lesion lies near the surface of the chest wall nearest the tube, it may not be detected at all by the roentgen ray. This error is lessened, but not eliminated, if the tube is some distance from the patient.

4. When small lesions are suspected on physical examination, the patient should be placed dorsoventrally if the lesion is suspected anteriorly, and ventrodorsally when suspected posteriorly, or, what is better, plates should be taken in both directions.

Roentgenotherapy in Certain Types of Neuritis and Neuralgia. Frances A. Ford, M. D. Minn. Med., June 1928.

A study of the analgesia produced by irradiation in eight cases of diabetic neuritis has shown only partial and gradual relief in about half the cases. In three cases of residual pain following herpetic inflammation temporary relief occurred in one case, gradual improvement in one, and in one, with the exception of a few days of freedom from pain after the second application, the treatment seemed rather to aggravate symptoms. Five cases of sciatic neuralgia, most of which were associated with chronic infectious arthritis (only one case affording objective data on which to base a diagnosis of actual neuritis), illustrated in each case the effectiveness of irradiation in securing relief of pain, usually within from twelve to twenty-four hours.

More comprehensive data with regard to the effect of irradiation in different varieties of nerve and inflammatory lesions must be assembled before a possible interpretation can be reached (from a clinical point of view) of the underlying mechanism by which pain is alleviated. Because of the freedom of this method of treatment from any injurious effect or tedious administration, and the gratifying result as yet unexplained in many dissimilar conditions, the use of the roentgen ray for securing analgesia is worthy of trial in all cases of severe pain.

It is to be emphasized that the irradiation required for this purpose lies well within the limit of tissue tolerance, and in this field in which there is clearly no indication for intensive irradiation, the radiotherapist has a responsibility in the avoidance of radiodermatitis, the occurrence of which even in first degree stages has done so much to prejudice the general public against the therapeutic use of roentgen rays.

Light Therapy in Deficiency Diseases in Children. Percival Nicholson, M. D. Atlantic M. J., May 1928.

Ultra violet light from the air cooled mercury-vapor quartz lamp is a specific in tetay, rickets, and spasmophilia, and is very valuable as a general tonic in depressed bodily states such as anorexia and some cases of anemia, and in poor nutrition. Ultra violet light holds out some hope as an aid in preventing the development of diabetes, and by its general tonic effect it is a valuable help in preventive medicine.

The experimental and clinical data are so definite and convincing with regard to the value of ultra violet light in deficiency diseases of children that there can no longer be any doubt as to the practical value of this form of treatment.

Electrocoagulation of Vesical Neoplasms Under Water with Adjustable Electrode. Gideon Timberlake, M. D. Jour. of Urology, May 1928.

The purpose of the new instrument originally was to arrest bleeding. The author felt that a vast improvement could be made in attacking superficial bladder tumors, which hitherto had been attacked by superficial fulguration or deep coagulation through cystotomy wounds, if we could submerge a current carrier into the mass or pedicle and convey a desiccation current. It has by this means as a substitute been possible to cast aside the high-heating monopolar current; reduce at least, the necessity for cystomies and electrocoagulation;

keep the patients up and about—a plan which makes it easier for all concerned.

Precautions. These instruments should not be boiled, but treated with disinfectant gasses or solutions and cleansed with soap and water when done with; no oils or greases should be used for lubricants; carbolic acid or lysol should not be used; thread wire into distal end in the flexible carrier and proximal end in inflexible; keep in straight container or suspend from distal end; be cautious against erosions and use soft rubber nipples on cystoscope.

Fulguration and desiccation have been in use too long to require description here. The simplicity and efficiency of the instruments presented, along with the lack of necessity for special and high priced transformers, recommend them. It is designed preferably for bipolar currents. We prefer to use metal-stuffed thigh pads, which are soaked in saline and placed about the thighs. They seem to give better grip and contact and make slight "shorts" almost impossible. The ivory exit nozzle does away with the metal ones which presume to do most of the work, thus diminishing the current efficiency in our objects of attack.

X Ray Treatment of Spontaneous, Post-Traumatic and Post-Operative Coccal Infection. G. Holzknecht. Acta Radiologica, Vol. VI. Abst. Brit. J. Radiol., May 1928.

According to somewhat old and neglected reports, systematic experiments of Heidenhain and Fried (Worms) and our similar experiences—Pordes, Rosenbaum, Borak, Vienna, and others—have surprisingly shown that in cases of acute and sub-acute coccal infection of all regions the rightly timed and correct action of the roentgen rays on the focus has, in the majority of cases, run a favorable course.

Statistics. Several hundreds of cases. In the beginning only a small percentage of results. With the technique of the present day about two-thirds of the cases of phlegmons and abscesses of the extremities, of the trunk, of the throat and face, furthermore of periproctitis, parametritis, of effects of an operation, postoperative pneumonia, etc., etc., are pronounced to be favorably affected, namely about one-third abortive or critical, one-third are quickly lytic. The remainder, including the infections of the accessory cavities of the nose, but also cases of all other tracts, show only indistinct influence, for unknown reasons.

Technic. The technic is sometimes that of roentgen therapy pure and simple, and sometimes combined with surgical treatment. As early as possible the focus and and its surroundings are once radiated with a light or medium penetration through 0.5 mm. heavy filter in a field with a superficial dose of about 20 per cent H.E.D. = 2 H. Under very severe conditions 1 H. in children ½-¾ H. The deep dose is not taken into consideration. After the lapse of 4-6 days of persistent effect, if the effect is imperfert, a second, or possibly a third, equal dose is administered. Curiously enough, higher doses commonly have no effect.

Course. In the favorable 60 cases out of 100, with or without initial increase, temperature, pain and swelling disappear quickly in 24 hours or tytically in a few days, either without leaving any traces behind or there is formed one or more fusions of pus (the best spontaneous course), which seldom perforates spontaneously, but which must be opened by a pricking incision or punction. Otherwise the process may again become inflamed. "Do not open before radiation." "Wait, and do not let yourself be worried by anything, even by lymphangitis" (Heidenhain).

Serologically. The radiation is followed for 4-6 days by a rise of the bacteriolysis in the blood. Sterile pus (otherwise rare) is frequent after radiation.

Explanation of the effect differs. According to Pordes: Injury to the highly susceptible leukocytes of the infiltration, liberation of the antitoxine and bacteriolysins retained in them in consequence of constitutionally pathological causes.

The Indications of the Milliammeter in the Evaluation of the Heat Produced by Diathermy Currents. Dr. H. Bordier. Brit. Jour. Radiol., May 1928.

Everyone who has practiced medical diathermy must have noticed the frequent anomalies that occur between the intensity of the current and the sensations of the patient. In order, however, to settle this question it is necessary to eliminate the factors of circulatory variations, and the sensibility of the subject, and to work with a medium of known chemical and physical properties such as was used in the author's original experiments.

The explanation suggested by d'Arsonval is that media traversed by high frequency oscillations do not behave purely as resistant conductors, but as media having both resistance and capacity, so that two currents pass between the electrodes, one, a current of conduction, and the other a capacity current. These currents tend either to reinforce or to neutralize one another as the case may be.

Recently Prof. Ch. Fabry has given mathematical explanation of the phenomenon discovered by d'Arsonval. His calculations have afforded confirmation of the experimental facts. The electrolytic solution is traversed by a "Wattfull" current of effective value. I, producing a quantity of heat expressed by RI^2, and by a "Wattless" current I_2, which produces no heat. The total current, I, which is indicated by the milliammeter is the sum of these two currents. It can be shown that with a given intensity and varying resistance, the quantity of heat given by Fabry's equation is maximal for a given resistance, and that this resistance corresponds fairly closely with that found experimentally by d'Arsonval. Furthermore, when the resistance has the extreme values of zero and infinity, respectively, the quantity of heat produced is nil in each case. That is to say that the heat production approaches zero when the resistance is either very small or very great. In the latter case the current is entirely "Wattless." Recalling

the actual values found in d'Arsonval's experiments (13 and 22,000 ohms), one sees how closely the experimental facts are in accord with the mathematical deductions.

These observations are applicable to living tissues, composed as they are, of electrolytes and colloids. The information given by the milliammeter is no guide to the heat produced in the tissues. With the same readings of the instrument, totally different temperature variations may be produced in the tissues. In the case of sodium chloride solutions, as has been seen, an intensity of 500 M.A. caused a temperature elevation of 96° with a certain concentration, while with a weaker or stronger concentration, the elevation of temperature was only a few degrees. This is an experimental result which demands the attention of all who practice diathermy. The only method of protecting patients from the danger of relying entirely on the indications of the milliammeter is to measure the temperature on the skin itself, covered by the electrodes, and especially on the skin under the smaller or active electrode.

The employment of thermo-electric couples of copper constantan would be a convenient and sensitive means for this purpose. One might utilize the automatically corrected pyrometer of A. Walter. The question is under investigation, and it is hoped that before long a practical solution may be obtained.

Experiments of Selective Ray Treatment on Vegetable Tumors. Prof. Mario Ponzio. Brit. Jour. Radiol., May 1928.

Among the principal causes which have led to the present pause in the evolution of radiological therapeutics, the first must be ascribed to the incomplete knowledge of the nature of the rays, and of the intimate processes of reaction which take place in matter in general, and in biological elements in particular. Krenbok's primitive hypothesis is mentioned with the comment that in view of the latest conceptions of the nature of matter and energy, this dogma has no longer any reason to exist.

After reviewing the many theories regarding plant tumors, mention is made of the experiments of several investigators, including Magrow, Rivera and Attili. There are several illustrations. It is clear that different factors act on the whole metabolism of the plant exposed to rays in relation to the different molecular decomposition which in the plasma ends and peri-cellular tissue is set up by the different rays striking it. It is important to mention how the neoplastic involutive processes are rendered more evident in plants when to the primary radiations is added the action of characteristic radiations from determined metallic radiators placed in contact with the tumor nodule. Other experiments are also discussed.

Of special importance are the studies made on the reaction latency of the neoplastic cells in relation to the nature of the ray used. It appears, in fact, evident that the involutive effect in the tumor nodules is so much the more precocious and intense, the younger are the neoformations exposed to the rays, but particularly when the action of the characteristic radiations of a given radiator of sufficiently high atomic weight is added to the primary rays. The period of reactive latency in these cases is notably reduced: this is not the case with neoplastic nodules in an adavnced stage of evolution for which the latency period lasts a long time and does not seem altered by the complementary action of the characteristic excited rays in auxiliary radiators. Evidently the selective action of the rays on plant neoplasms takes effect in different ways according to the quality of the rays, and the nature of the new formations: and, therefore, the clearly destructive action of the characteristic rays on the bacterium causing the tumor shows itself in the first period of the tumor's growth together with that exercised by the primary rays on the cellular elements of neoformation. These in their turn react variously and, in the first period of development, show special sensitiveness for the rays which, absorption being the same, present medium wave lengths, gradually assuming more conspicuous radioresistance, also for the more penetrating rays of the spectrum with successive evolution of the lesion towards suberification.

The experiments as a whole would tend to demonstrate that for vegetable neoplasia reaction to rays may take place in various ways according to the different stages of tumoral evolution, and the quality of the rays used.

Primary Malignant Tumors of the Neck and Their Treatment. R. Carter Crain, M. D. Illinois M. J., June 1928.

The author details this subject supplementing it with an exhaustive survey of the literature. The treatment is likewise considered, and the following quotation drawn from the original article:

In localized cases the best results are obtained with surgery and radium in combination. With the exception of lymphosarcoma, where the knife certainly holds no authority, I believe that the imbedding of radium needles at the time of operation followed by external applications of heavily screened radium over the whole area of the neck, as well as the field of excision, offers the only reasonable hope of permanent relief.

It is a well known fact that some types of tumors are more easily affected by radiation than others. This has given rise to the idea that the gamma ray exerts a selective action on certain tissues. Such conclusions are misleading. All types of cells are affected by radiation if the dose is sufficiently large. The picture is better described as one of differential action. In general, tumors derived from embryonal cells and retaining embryonal characters are more susceptible to radiation than tumors derived from adult cells and reproducing adult cell types.

In the more resistant growths I believe intratumoral radiation is always the method of choice for the following reasons: (1) Kepler's law states that the amount of energy received at any point varies inversely as the

square of the distance. (2) To deliver a sufficient intensity of radiation to an area beneath the skin might require more energy than the skin can tolerate, and the result would be a destruction of the cutis with undesirable ulceration. (3) By imbedding the radium in the growth itself, the damage to the skin is negligible and the tumor receives 100 per cent of the energy.

Broadly, indurated tumor masses offer no promise of permanent cure with radium, although the progress of extension may be arrested for a variable length of time.

Lymphosarcomas, if diagnosed early and no attempt is made toward excision, occasionally may be arrested for several years. This type of tumor cell offers less resistance to radiation than any other. To witness a mass 5 cm. in diameter disappear in 96 hours is not a miracle but an actual fact. Following the treatment of the local area the surrounding lymphatic channels should likewise be covered. If no metastases appear in the deep organs in a year, I consider the prognosis favorable.

Advanced cases, presenting marked deformity and pain as well as pressure signs, which include dysphagia, hoarseness, tinnitis, edema of the head and lockjaw, are pitiful aspects. Such patients are beyond the realm of surgery, but may receive prompt benefit from radium. After treatment, the continual pain disappears; the edema melts away; the voice improves; the dysphagia is forgotten; and the jaws regain their previous mobility. Although such miraculous improvement is only temporary, it must be admitted that something worth while has been done in the patient's behalf. Life has been prolonged and suffering relieved.

Wood's Glass and the Detection of Ringworm by Its Fluorescent Properties. N. Gray Hill, M. C., M. B., B. S., Lond. Brit. J. of Child Diseases, Jan.-March 1928.

The method used at Carshalton is to have a small piece of Wood's glass, about 2 in. square, in an applicator that can be fixed in front of the window of a Kromayer lamp. Both a large air-cooled mercury vapor lamp and a small carbon arc were tried as sources of light, but they were not very satisfactory, although in the case of the mercury vapor lamp objects fluoresce quite well. The only drawback to the Kromayer lamp is that it is water cooled and must have cold water running through it. This is managed by using two flexible tubes, one connecting the lamp to a water-tap and the other to a sink. The room in which the examination is carried out should be darkened, but it should not be too dark, as this tends to frighten the children and so delay the work. It is best to have several children in the room at the same time; this allows their eyes to get accustomed to the darkness, and also as they see what is required of them less time is wasted. In the case of boys, a very thorough examination can be made at the rate of 25 or 30 an hour, but with girls only about half this number can be dealt with. The patient should be seated in a chair and the lamp should be held two or three inches from the scalp; it can easily be manipulated with one hand, leaving the other free to brush up the hair. If the hair is infected (*Trichophyton microsporon* is the only type I have been able to investigate), the infected hairs will light up as they come under the rays of the lamp and become a most vivid green color, the scalp and uninfected hairs being only just illuminated by the purple light. The appearance is most striking in the case of a small patch of ringworm, but if only one or two hairs are involved they are easily recognized, and look like live electric filaments among the normal hairs. If an infected hair is removed and examined under the microscope with the Wood's glass and Kromayer lamp to illuminate the reflector, the hair will appear a metallic green.

So far as my experience goes, there is nothing that can be mistaken for ringworm when seen under the "ringworm lamp." Vas line, brilliantine and ointments made up with a basis of vaseline are the only fluorescent substances commonly found on the head, and if present fluoresce in a most striking manner, but the colo is an electric blue, and, as a rule, both the scalp and hairs fluoresce. With ringworm the vivid green fluorescence is confined strictly to the infected hairs. Vaseline can be washed off with warm soap and water. Most scaly patches on skin or scalp fluoresce very slightly, but this cannot be confused with the brilliant fluorescence due to ringworm. Dr. Knowsley Sibley reported fluorescene of the skin in the case of tinea of the forehead when there was no infection of the hair. I have not tested any case of ringworm of the skin. One child, when admitted, had a sweet or jujube colored by some fluorescent dye entangled in her hair and this lit up like some beautiful jewel when examined under the lamp, but examination with the naked eye in ordinary light showed the nature of the foreign substance.

In a hospital such as Queen Mary's, where many of the patients are suffering from disease of the spine or of important joints and are treated for prolonged periods on special appliances, it is essential to prevent the introduction of ringworm, and yet by ordinary methods of examination it may be very difficult to diagnose a case, especially when there are but a few hairs infected. Every child on admission is now examined under the "ringworm lamp" before being sent to the ward, and it seems reasonable to expect that every case of ringworm will be diagnosed with ease and certainty, and so infection of other patients prevented. The use of Wood's glass, however, should not be confined to hospitals. Small lamps suitable for the work are not very expensive and can be used with the ordinary lighting current. Such lamps should be installed in school clinics and all children's homes and institutions at which electric current is available.

In conclusion I think it may fairly be claimed that the use of Wood's glass gives us an easy and certain method of diagnosing ringworm even when it is in the earliest stages, and what is almost of equal importance, provides us after treatment with a ready method of

telling when a child is cured and fit to mix with its fellows. Systematically used it should lead to the stamping out of ringworm in the immediate future.

The Reactions of the Body to the Short Cold Bath. W. H. Riley, M. D. Am. J. of Surgery, June 1928.

A short cold bath increases the circulation and nutrition of the skin, increases muscle tone, increases muscular endurance and capacity, lessens muscular fatigue, increases the force and lessens the rate of the heart beat, increases the tone of the heart muscle, increases the tone and nutrition of the blood vessels, increases systolic and pulse blood pressure, decreases diastolic pressure, stimulates and improves the circulation, increases the depth and rate of respiration, increases the oxygenation of the blood, increases absorption of oxygen, increases the metabolism and chemical changes of the body, increases the production and elimination of CO_2, increases heat elimination and production, increases the number of blood elements and hemglobin in the blood, improves the appetite, stimulates digestion, increases peristalsis of the digestive tract, helps to relieve constipation, increases the activity of the kidneys, increases the output of total fluid, solids and urea in the urine, increases the normal irritability and conductivity of the nerves, improves nerve tone, and is a general tonic. Its use and contraindications are given.

The X-Ray Treatment of Amenorrhea with a Report of Thirty-Eight Cases. Ira I. Kaplan, M. D., Amer. Jour. Obs. and Gyn., Vol XV, May, 1928, Page 658.

Kaplan shows that amenorrhea and sterility can be treated by x-ray. Of 38 cases treated, 30 responded favorably with menstruation and 11 subsequently became pregnant. No abnormal children were born in his series of radiated cases, which permits Kaplan to conclude that when properly treated no harm ensues to patient or offspring. The technic used was as follows: In all cases, highvoltage x-rays, KV, 4-MA, 0.5 copper, one aluminum filter, 23-30 cm. distance, 6x8 and 9x12 portals. The treatment was given over the right and left anterior posterior ovarian areas with alternate dosage one week apart. The total dosage on the ovaries varied between 10-15 per cent of skin erythema dose.

Radiotherapy in Carcinoma of the Ovary. Francis A. Ford, M.D., Amer. Jour. of Obs. and Gyn., July, 1928, Vol. 16.

Ford classified ovarian malignancies into its pathologic types and analyzed the effect of radiation therapy on the early and late carcinomas. The methods utilized was a study of the extent of the involvement at the time of operation, the nature of the operation performed, and the mode of postoperative irradiations. The technic and dosage is fully described. Postoperative vaginal irradiation by radium packs in doses of 700- to 2100-milligram hours were instituted; or this combined with roentgen ray at moderate voltage tension. In some instances roentgen rays alone were utilized, usually in repeated courses; often a combination of rays, produced at moderate or high voltage tension, were the methods employed by Ford. This depended upon the extent of the growth, and whether or not the growth was completely removed. The series reported showed a longer interval of freedom from recurrences as compared to the early recurrences reported by other authors. This was attributed to the postoperative irradiation. Ford also found the judicious use of radium and roentgen ray useful even in the far advanced cases. For cachectic patients, repeated or carefully graded irradiations have given superior results.

A. E. Kobak, M.D.

Observations on the Biochemical Changes in the Blood Following Radium Therapy. H. B. Mathews and V. P. Mazzola, Amer. Jour. of Obs. and Gyn., July, 1928, 16:97.

Mathews and Mazolla base their report on a study of one hundred cases in which the chemical analysis of the blood was determined before and after radium therapy. The blood urea was found to be elevated slightly in both benign and malignant conditions after radium irradiation. No definite relation could be established between increased blood urea and the reaction, and the CO_2 combining power of the blood was not affected by irradiation. The chemical and laboratory findings did not indicate any renal impairment to follow the irradiation. —Alfred J. Kobak